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The Impact of the Anti-Predatory Lending Laws on Mortgage Volume

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Abstract

In this paper, I test the hypothesis that anti-predatory lending laws inhibited the volume of mortgage lending during the housing-bubble period. I use cross-state variation in the strictness of these laws and their application only to mortgage refinancing as opposed to home purchases to develop a difference-in-difference estimate of the impact of these laws on mortgage volume. Consistent with my hypothesis, I find that states with stricter laws had lower mortgage refinancing volume but exhibited no difference in home purchase mortgage volume. I also test whether by restricting mortgage refinancing, these laws impacted household expenditures and find that the laws reduced household expenditures.

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1. Introduction

In this paper, I test the impact of anti-predatory lending laws, examining 1) whether the laws inhibited mortgage volume, especially in mortgage refinancing, during the housing-bubble period and 2) whether restricted mortgage refinancing as a result of these laws reduced household consumption. Predatory mortgage lending has been generally defined as a variety of unfair or deceitful lending practices, directed at "vulnerable populations," that often result in serious personal losses, including bankruptcy and foreclosure. Predatory lending practices in the home mortgage market have grown with mortgage credit expansion.

To cope with increasing evidence of predatory lending practices, Congress enacted the Home Ownership and Equity Protection Act (HOEPA) in 1994. However, HOEPA was not sufficient to curb predatory lending in the mortgage market. Consequently, starting with North Carolina in 1999, many states enacted laws limiting predatory mortgage lending. As of January 2007, 31 states and the District of Columbia had anti-predatory lending laws in effect. I use cross-state variation in the strictness of these laws to test hypothesis.

The impact of anti-predatory lending laws is a little-studied but important question, since the laws are closely connected to the three characteristic features of the recent housing crisis. Specifically, during the housing-bubble period, loose lending standards caused excessive mortgage lending.[1] The extended credit was heavily concentrated on the populations who were the most liquidity-constrained, such as racial minorities, the elderly, and the uneducated.[2] Finally, the "refinancing rachet effect," meaning the asymmetry in refinancing activity against the home price change, played a critical role in the recent crisis.[3] Since anti-predatory lending laws were designed to impose stricter lending standards on high-cost loans, especially on mortgage refinancing, and the targets of predatory lending coincided

[1]See Dell'Ariccia, Igan, and Laevan (2009), Mian and Sufi (2009), Keys, Mukherjee, Seru, and Vig (2010), and Demyanyk and Van Hemert (2009) regarding the loose lending standards.

[2]See Mian and Sufi (2009) and Rugh and Massey (2010) regarding the concentrated mortgage lending to vulnerable populations.

[3]Khandani, Lo, and Merton (2010) found that the asymmetry in refinancing mortgages played a critical role in the crisis: the partial extraction of home equity is possible when home prices appreciate, but the partial liquidation of homes is not possible when home prices drop.

with the populations with extended credit, the role of anti-predatory lending laws during the housing-bubble period is expected to be significant. In fact, major settlements on abusive lending allegations in recent years hint at the extent of predatory lending and the application of the laws (U.S. General Accounting Office (2004)). In 2002, Household International[4] paid a $484 million settlement on allegations that it used unfair and deceptive lending practices. Citigroup also paid a $240 million settlement in 2002 alleging that subsidiaries of Citibank[5] engaged in systematic and widespread abusive lending practices.

Anti-predatory lending laws are different from traditional usury laws because they do not impose any interest ceiling, but rather, require stricter lending standards on high-cost loans. HOEPA was the first anti-predatory lending law and the prototype for state anti-predatory lending laws. HOEPA applied to closed-end loans secured by the borrower's principal residence, and did not cover home purchase loans. Once a loan met the criteria for HOEPA, lenders had to provide more detailed disclosures to the borrower. Under HOEPA, balloon payments, negative amortization, prepayment penalties, and loan flipping were partially or fully restricted. Government-sponsored enterprises (GSEs), such as the Federal Home Loan Mortgage Corporation (Freddie Mac) and the Federal National Mortgage Association (Fannie Mae), were not allowed to purchase mortgage loans covered under HOEPA.

Since HOEPA was deemed insufficient to curb abusive practices, many states enacted laws limiting predatory mortgage lending to fill HOEPA's gaps. State anti-predatory lending laws followed HOEPA's structure but employed varying levels of strictness based on their own interests. As a result, state laws varied in the strictness of their provisions. Common HOEPA structure makes it convenient to compare the strictness of the laws across the states.

I use cross-state variation in the strictness of these laws and their application only to mortgage refinancing as opposed to home purchases to develop a difference-in-difference estimate of the impact of these laws on mortgage volume. Since the laws applied only to

[4]Household International, Inc. was the oldest, as well as the second largest, consumer finance company in the United States. On March 28, 2003, HSBC acquired Household International, which was merged in 2005 with a subsidiary company of HSBC that became the HSBC Finance Corp.

[5]Associates First Capital Corporation and Associates Corporation of North America

mortgage refinancing and not to home purchases, but the predatory lending occurred in both markets, a stark contrast between the two markets will identify the laws' effect by using the home purchase market as a control group.

I use the anti-predatory lending (APL) law index from the Corporation for Enterprise Development (CFED), a nonprofit organization that evaluates state policies, to evaluate the strictness of the various state laws. I use data from the Home Mortgage Disclosure Act– the most comprehensive data on home mortgage origination– for mortgage origination.

Consistent with my hypothesis, I find that states with stricter laws had lower mortgage refinancing volume but exhibited no difference in home purchase mortgage volume. On average, a unit increase in the APL law index raises the mortgage denial rate by 0.43%, decreases the amount of mortgage originations by 2.85%, and decreases the number of mortgage applications by 1.69% when all other variables are held constant. Considering that the APL law index ranges from 0 to 12, the results show significant reduction in refinancing volume in states with the strictest laws. The economic significance of the APL law index is also large.

Whether the reduction in mortgage volume comes solely from inhibited predatory loans remains as an empirical question. In principle, the anti-predatory lending laws can also inhibit legitimate high-cost loans. Previous studies on the laws' effect showed that the reduction in subprime mortgage volume mostly came from high-cost loans with predatory terms (Elliehausen, Staten, and Steinbuks (2006); Li and Ernst (2007)). I also find that the reduction in mortgage refinancing volume becomes larger as the Loan-to-Income ratio increases. Considering that the Loan-to-Income ratio is one of the frequently used proxy measure for riskiness of loans, this result shows that the laws have been more influential on loans with higher risk characteristics.

I also test whether by restricting mortgage refinancing, these laws impacted household expenditures. The wealth effect of housing value is limited by the novel nature of the housing asset, that is, people have to live somewhere. Increased home equity can be realized mainly through mortgage refinancing. Mian and Sufi (2011) found that money extracted through

refinancing was not used for the repayment of existing debts, and concluded that the money was used for "real outlays" such as consumption or home improvements.

I use the result that the laws inhibited the mortgage refinancing volume to estimate a reduced form model for the APL laws' effect on household expenditures. Again, I use the CFED law index for law strictness and use the Consumer Expenditure Survey by the Bureau of Labor Statistics for household expenditures. I find that strict APL laws are significantly associated with the reduction in total expenditures. On average, a unit increase in the law index reduces total expenditures by $754 when all other variables are held constant. Moreover, reductions are also found in various categories of expenditures, including Food, Housing, Transportation, and Personal Insurance and Pensions. On average, a unit increase in the law index reduces annual expenditures on Housing by $273.1, Transportation by $173, Personal Insurance and Pensions by $92.75, and Food by $64.08.

Next, I instrument the amount of origination (AMTO) in mortgage refinancing with the APL law index to conduct IV analysis. I find that the instrumented AMTO increases total household expenditures. Many of the categories of expenditures increased as well. This indicates that a significant portion of household expenditures have been increased by extended mortgage refinancing availability in states with weak APL laws. Since the APL laws discipline the mortgage refinancing market by restricting excessive lending, the extra expenditures must have been unsustainable without the influx of home equity dollars.

This paper contributes to the policy literature regarding the effect of anti-predatory lending laws on mortgage volume. While I focus on the laws' effect on mortgage *refinancing* volume, overall *subprime* mortgage volume has been a main focus of other studies. Starting with an evaluation of the North Carolina anti-predatory lending law, national-level studies followed as the number of states with such laws increased. Although the results vary with data and sample periods[6], there is a consensus that subprime applications and originations

[6]For analyzing the NC law's effect, different data sets with different sample periods are used in the studies. The HMDA data is used by Harvey and Nigro (2004) (1998-2000) and Burnett, Finkel, and Kaul (2004) (1997-1998, 2000-2002). Subprime loans in the HMDA data are identified using the HUD list of subprime lenders. Elliehausen and Staten (2004) use the subprime data from the American Financial Services Association

decline with APL law adoption, especially among lower-income borrowers, minority groups, and non-bank subprime lenders. In addition, significant reductions are found in the volume of high-cost loans and loans with predatory terms.

This paper also contributes to the literature regarding the wealth effect of housing value on household consumption. Since rising home values also increase the user cost of housing, a direct wealth effect of housing on household consumption has been denied in previous literature.[7] However, Muellbauer (2008) finds that the home equity market plays a pivotal role on the housing wealth effect, through mobilizing increased home equity. In addition, Cooper (2009) finds that the wealth effect appears only among budget-constrained households. Hurst and Stafford (2004) also find that liquidity-constrained households convert two-thirds of every dollar from home equity extraction into consumption. This paper complements previous studies regarding the wealth effect on household consumption, by analyzing the effect of various state laws that seek to control mortgage refinancing volume, especially toward predatory-targeted populations.

The rest of the paper proceeds as follows: Section 2 explains the state anti-predatory lending laws and analyzes the various indices for the cross-state law variation; Section 3 explains and summarizes the data; Section 4 reports the results regarding the effect of anti-predatory lending laws on home mortgage origination; Section 5 reports the results regarding the effects of anti-predatory lending law on household expenditure; Section 6 provides additional discussions; Section 7 concludes.

(1995-2000) and Quercia, Stegman, and Davis (2004) use the Loan Performance data (1998-2002). For the national-level studies, the HMDA data is used by Ho and Pennington-Cross (2006) and Bostic et al. (2008). Elliehausen, Staten, and Steinbuks (2006) use proprietary data on subprime mortgages by the subprime subsidiaries of eight large financial institutions from 1997 to 2004. Li and Ernst (2007) use the Loan Performance data on securitized subprime loans from 1998 to 2005.

[7] Case, Quigley, and Shiller (2005); Calomiris, Longhofer, and Miles (2009); Carroll, Otsuka, and Slacalek (2011). See Peek (2010) for detailed literature review.

2. The Anti-Predatory Lending Law

Home mortgage loans are types of loan that are collateralized by the value of the underlying residential property. Homes account for a large part of household wealth but are normally illiquid and indivisible assets. Mobilizing home equity is important for households' lifetime consumption smoothing, especially for those who are liquidity-constrained. In fact, home mortgage loans are one of the most commonly used financial products in the United States.

Predatory lending has been generally defined as a variety of unfair or deceitful lending practices, aimed at "vulnerable populations", that result in serious personal losses, including bankruptcy and foreclosure.[8] Quantifying the extent of predatory lending is impracticable due to the absence of a precise definition of the term, since the abusiveness of any particular loan depends on the overall context of the loan and the borrowers. However, major settlements on abusive lending allegations in recent years hint at the extent of predatory lending (U.S. General Accounting Office (2004)). For example, in October 2002, Household International[9] paid a $484 million settlement on allegations by attorneys general in 46 states that it used unfair and deceptive lending practices. In September 2002, Citigroup paid a $240 million settlement on charges by the Federal Trade Commission and private parties alleging that Associates First Capital Corporation and Associates Corporation of North America, subsidiaries of Citibank, engaged in systematic and widespread abusive lending practices.

Predatory lending in the home mortgage market emerged after the deregulations of 1980s. Originally, state usury law regulated home mortgage loans as a part of consumer loans. Usury laws, which prohibited any loans with interest rates higher than the usury ceiling, caused an insufficient credit supply in the mortgage market. Credit shortages increased when interest

[8]The formal definition of predatory lending can be found in Engel and McCoy (2002). They defined predatory lending as "a syndrome of abusive loan terms or practices that involve one or more of the following five problems: 1) loans structured to result in seriously disproportionate net harm to borrowers; 2) harmful rent seeking; 3) loans involving fraud or deceptive practices; 4) other forms of lack of transparency in loans that are not actionable as fraud; and 5) loans that require borrowers to waive meaningful legal redress."

[9]Household International, Inc. was the oldest, as well as the second largest, consumer finance company in the United States. On March 28, 2003, HSBC acquired Household International, which was merged in 2005 with a subsidiary company of HSBC that became the HSBC Finance Corp.

rates rose significantly during late 1970s.[10]

Because the home mortgage market was important for households and their secured nature was different from the other consumer loans, deregulations in the home mortgage market continued from late 1970s into the early 1980s. As part of the deregulation, home mortgages were exempted from state usury laws, and the use of alternative mortgage transactions was allowed.[11] Home mortgage loans with high interest rates and alternative mortgage features such as adjustable rates or balloon payments became possible, including predatory home mortgage lending.

Behind the deregulation, there was a firm belief in the market. If mortgage lenders competed and households were informed enough to choose the best deal between different products, the market would price mortgage products properly without any legal guidance. To allow for comparison by borrowers, the Truth in Lending Act of 1968, or TILA, required disclosures about terms and the cost of mortgage loans. However, the TILA was not mandatory and additional regulation was needed to curb increasing predatory lending practices.

The Anti-Predatory Lending Laws: Federal and State

In 1994, Congress enacted the Home Ownership and Equity Protection Act, or HOEPA, amending TILA to deal with increasing predatory lending practices in the home equity market. HOEPA was the first comprehensive anti-predatory lending law that applied to closed-end loans secured by a borrower's principal residence, other than home purchase loans. HOEPA regulated "high-cost loans", which were loans exceeding one of the following two triggers: (1) the annual percentage rate (APR) exceeded the yield on comparable Treasury

[10]For example, the federal funds rate was 5.54% in 1977, 7.94% in 1978. By 1979 it jumped up to 11.2%, in 1980 it was 13.35%, and in 1981 it was 16.39%. http://www.federalreserve.gov/releases/h15/data.htm

[11]The Depository Institutions Deregulation and Monetary Control Act of 1980 preempted state usury ceilings from any mortgage secured by a first lien on residential property. The Alternative Mortgage Transaction Parity Act of 1982 preempted the state statues that restricted the use of alternative mortgage transactions, such as adjustable rate mortgage, balloon payments and negative amortization, from the loans secured by residential property. These deregulations ultimately set the stage for the subprime home equity industry today. More details can be found in Mansfield (2000).

securities plus 8%[12](10%) for first-lien (subordinate-lien) loans; or (2) total points and fees exceeded the greater of 8% of the total amount of the mortgage or a set dollar amount ($592 for 2011[13]).

Once a loan met the criteria for HOEPA, lenders must provide more detailed disclosures in addition to those required by TILA. Further, some loan features were partially or fully restricted, including balloon payments, negative amortization, prepayment penalties, and loan flipping.[14] Lenders were not permitted to originate mortgage loans based on the value of the collateral but were required to check a borrower's repayment ability. The government-sponsored enterprises (GSEs), such as the Federal Home Loan Mortgage Corporation (Freddie Mac) or the Federal National Mortgage Association (Fannie Mae), were not allowed to purchase mortgage loans that fell under HOEPA.

However, the federal regulation was not sufficient to curb ongoing predatory practices in mortgage markets.[15] Some critics have charged that the triggers for the high-cost loans in HOEPA were too high. Facing problems with growing predatory mortgage lending, states started to enact anti-predatory lending laws to bolster consumer protection from these predatory practices. Starting in North Carolina in 1999, laws limiting predatory mortgage lending were adopted. As of January 2007, 31 states and the District of Columbia had anti-predatory lending laws in effect.

For their own anti-predatory lending laws, states followed HOEPA's structure but employed varying levels of strictness based on their own standards. As a result, the strictness of anti-predatory lending laws differs by state. For example, in North Carolina's anti-predatory lending law, the APR trigger remained the same as HOEPA, but the trigger for points and fees was reduced from 8% of the total amount to 5% for loans under $20,000. North Car-

[12]The APR trigger for first-lien was 10% in original HOEPA. But it has been lowered to 8% in the amendment of 2002.

[13]Exact dollar amounts are adjusted annually, based on the Consumer Price Index.

[14]Balloon payments for loans with less than five-year terms were restricted. Refinancing within twelve months without the best interest of borrowers (loan flipping) and prepayment penalties beyond five years after origination were banned. Negative amortization and due-on demand clause were fully restricted.

[15]See the U.S. Department of Housing and Urban Development (2000) on the continuing predatory lending practices after HOEPA.

olina's anti-predatory lending law also prohibited balloon payments for all high-cost loans, while HOEPA only banned balloon payments for loans with less than five-year terms. Consequently, the North Carolina anti-predatory lending law covers a larger group of mortgages than HOEPA, with tighter restrictions.

Indices for the State Anti-Predatory Lending Laws

To capture the cross-state variation of the law strictness on predatory mortgage lending, quantitative law indices have been developed in earlier studies. Indices measured the strictness of state laws relative to HOEPA. However, due to the complexity in the law variations, creating a quantitative index of a qualitative law is far from simple. Accordingly, previous law indices showed significant differences. In this section, I review the indices in previous studies and examine the differences between the indices. Three different indices by state are reported in panel A in Table 1. The Summary statistics of the indices are reported in panel B.

In the first index, the Corporation for Enterprise Development[16] (CFED) rated the strength of state regulations on curbing predatory lending based on information obtained from the Center for Responsible Lending (CRL)[17]. CFED evaluated eight features of state anti-predatory lending (APL) laws as they existed in 2007. Those features were: 1) the type of loans covered; 2) points and fees triggers; 3) substantive legal protections; 4) remedies available to borrowers; 5) the regulations on loan-flipping; 6) prepayment penalties and; 7) sound underwriting.[18] The CFED Index was the sum of the scores of the eight law features.

[16]The Corporation for Enterprise Development is a national nonprofit organization based in Washington, DC. CFED publishes research, partners with local practitioners to carry out demonstration projects and engages in policy advocacy work at the local, state and national levels. CFED provides state policy measures on various subjects. More details can be found at http://scorecard.cfed.org/.

[17]The Center for Responsible Lending (CRL) is a nonprofit , non-partisan research and policy group based in Durham, North Carolina, and with offices in Washington, DC and Oakland, California. Its purpose is to educate the public about financial products and to advocate for policies that curb predatory lending. CRL is affiliated with the Center for Community Self-Help.

[18]The CFED Index was constructed by a method analogous to the method used by Li and Ernst (2007)(LE Index). Li and Ernst (2007) ranked state APL laws according to six criteria including the type of loans covered, points and fees triggers, substantive legal protections, and remedies available to borrowers. Two more criteria were added to the CFED Index, in addition to the six criteria of the LE Index. The CFED

Column (1) in Table 1.A reports the CFED Index. North Carolina, New Mexico, and Massachusetts were in the group of strict APL law states. In contrast, Arizona, California, and Nevada were in the group of weak APL law states.

In the second index, Ho and Pennington-Cross (2006) developed a two-component index of state APL laws as they existed in 2005. Hereafter, the index will be denoted as the HP Index. The HP Index consisted of two subindices: 1) the Coverage Index and; 2) the Restriction Index. The Coverage Index measured the breadth of law coverage, and the Restriction Index measured the strictness of law restriction. The Coverage Index was defined as the sum of ratings in four criteria regarding the coverage of the law. The criteria for law coverage included the type of loans covered, APR triggers, and points and fees triggers. Each criterion was rated by the relative strictness of the state law to HOEPA. Construction of the Restriction Index was similar to the Coverage Index. Criteria regarding law restriction included restrictions on prepayment penalties and balloon payments. The Full Index was the sum of the Coverage Index and the Restriction Index. Columns (2)-(4) in Table 1.A report the HP Index. The index covered only 25 states. In terms of the Full Index, Illinois, Colorado, and Georgia were the strictest APL law states. And Nevada, Maine, and Florida were the weakest APL law states. The Coverage Index and the Restriction Index were weakly correlated. The correlation between the two indices was 0.35 (Table 1.C). For example, Colorado was one of the strict APL law states in terms of the Coverage Index but it was not strict in terms of the Restriction Index. This means that the Colorado APL law covered broader types of mortgage loans but the restrictions on the covered loans were weak.

In the third index, Bostic et al. (2008) extended the HP Index by introducing an additional index for law enforcement. Hereafter, that index will be denoted as the BEA Index. The three subindices of the BEA Index were the Coverage Index, the Restriction Index, and the Enforcement Index. The Coverage Index and the Restriction Index were analogous to

Index and the LE Index are highly correlated (the correlation is 0.9). Knowing that Li and Ernst were affiliated with the CRL and the CRL provides information to the CFED, the close relationship between two indices is not surprising.

the corresponding indices in the HP Index. The Enforcement Index measured the scope of liability and the strength of available legal actions when violations occurred in loan origination. The Enforcement Index was defined as the sum of the ratings in two criteria regarding law enforcement (i.e. assignee liability). The Enforcement Index increases with larger responsibility and stronger penalties on violations. For example, if assignees of mortgages were liable even after the exercise of due diligence, the Enforcement Index would be high. The BEA index covered all the states. The Full Index is defined as the sum of the three indices. Columns (5)-(8) in Table 1.A report the BEA Index. According to the Full Index, New Mexico, West Virginia, and Massachusetts are the states with the strictest APL laws.

In Panel C of Table 1, the correlation matrix of the indices is reported. In summary, the correlation matrix shows some level of consistency among the indices, but also shows significant differences among them. First, all indices are positively correlated. The law variation roughly coincides within the indices. Second, the correlations within the indices based on components of the law that are similar tend to be higher than the correlations across the indices based on components of the law that are different. For example, the Coverage Index of the HP Index is more correlated with the Coverage Index of the BEA Index than with any other indices. The Restriction Index of the HP Index shows the highest correlation with the Restriction Index of the BEA Index. Third, the indices based on components of the law that are similar are not highly correlated, considering that the indices are intended to capture similar law variations. The correlation between the Coverage Indices is 0.57 and the correlation between the Restriction Indices is 0.63. This shows significant differences across law indices. Last, the CFED Index and the Enforcement Index of the BEA Index are more correlated with the Restriction Indices than the Coverage Indices.

There are several reasons for the differences. First, the major difference emanates from the selection of index criteria for measuring law strictness. Note that all of the indices have been constructed by the weighted sum of the score from the criteria. It is relatively straightforward to rank the laws by a single criterion since the state APL laws have followed

HOEPA's structure. For example, Utah has maintained the points and fees trigger as in HOEPA (8% of total loan amount), but North Carolina has lowered the trigger to 5% for loans under $20,000. Therefore North Carolina has stricter regulations than Utah in terms of the points and fees trigger. In cases of the restriction on prepayment penalties, Pennsylvania has maintained the five-year periods of prepayment penalties as in HOEPA, but Massachusetts has banned all prepayment penalties for high-cost loans. Therefore Massachusetts has stricter regulation than Pennsylvania on prepayment penalties. However, the selection of criteria has been an issue and has generated the divergence found in the law indices. The CFED index evaluated eight features of the law, which were selected by the experts at CRL. The criteria were chosen by authors for the HP Index and the BEA Index. The Coverage Indices and the Restriction Indices included four criteria and the Enforcement Index included two criteria.

Another reason for the differences in the law indices stems from the inclusion of non-HOEPA-type regulations. Following HOEPA, many states introduced "comprehensive" APL laws to curb predatory lending. "Comprehensive APL laws" refer to complete laws, uniquely designed to curb predatory lending in the home mortgage market. In column (9) of Table 1.A, effective dates of the state APL laws are reported.[19] An effective date exists only if the state adopted a comprehensive anti-predatory lending law.[20] However, there are some states that have selective regulations on the recurrent practices of the predatory lending, even though no comprehensive APL law has been enacted. These selective regulations existed in other consumer credit laws. For example, Iowa has restrictions on prepayment penalties in home mortgage loans, but has not enacted any comprehensive APL law.[21] These non-HOEPA-type regulations are incorporated in the CFED Index but not in the HP Index or the BEA Index.[22]

[19]The source of data include the Standard & Poor's Predatory Lending Categories and summary reports from Butera & Andrews, a law firm.

[20]Having an effective date does not directly mean that the state law is strict. Some states have enacted the state laws but the laws have been only a copycat statutes of HOEPA. Those include Florida, Kentucky, Maine, Nevada, Ohio, Oklahoma, Pennsylvania, and Utah (Ding, Quercia, and White (2009)).

[21]Details can be found in the chapter 535.9 of the Iowa law.

[22]Bostic et al. (2008) also constructs additional indices on the non-HOEPA-type regulations. The indices show low correlations with the indices in table 1. Details are omitted for brevity.

Unfortunately, the law indices are not perfect and are not free from some limitations in measuring state anti-predatory lending laws. First, all of the law indices are static and evaluate state anti-predatory lending laws as they existed at a certain point in time. The CFED Index evaluates APL laws as they existed in 2007 while the HP Index and the BEA Index evaluates the laws as they existed in 2005. The effective dates of the state laws are reported in column (9) of Table 1. Note that states adopted anti-predatory lending laws during the sample period of 1998-2007. Second, there are some states that did not exclude home purchase loans from their own state laws, but none of the law indices make that distinction. On the surface, these laws also applied to home purchase loans, but it is ambiguous as to whether the states consciously included home purchase loans in their APL laws, especially when the state's tendency toward replicating federal regulations is considered.

The Anti-Predatory Lending Law Index for Analysis

For the state APL law index in following analysis, I mainly use the CFED Index to show the aggregate effect of the law. The CFED Index has several advantages over other indices for measuring aggregate law effect. First, in terms of closeness to the first principal component of the law indices, the CFED Index is a representative law index. The principal component analysis (PCA) is used to identify the core variation among different law indices in Table 1. The first principal component explains 51% of the variations within the indices. Further, the first principal component is most highly correlated with the CFED index, with a correlation of 0.87. Second, the CFED index is a single dimensional index. Multi-dimensional measures, such as the BEA Index and the HP Index, are useful to understand partial law effects. But without a reasonable weighting method, it is difficult to judge the aggregate law effect, especially when partial effects conflict with each other. Lacking a generally accepted method for aggregating multi-dimensional measures, Bostic et al. (2008) proposed an additive index, which is the Full Index. However, the Full Index assumes that partial effects from the Coverage Index and the Restriction Index have equal weights on aggregate law effect. Third, the

CFED Index includes non-HOEPA-type regulations. By ignoring non-HOEPA regulations, other indices may underestimate the law strictness in some states. Last, the CFED Index exists for all the states while the HP Index is only available for the half of the states.

To avoid the issue of law persistence, which encompasses anticipatory compliance with forthcoming laws and lagtime in compliance after enactment, and the issue of pre-existing non-HOEPA law, a static cross-section of the CFED Index has been applied in the analysis. However, I develop a time-varying CFED Index by interacting the CFED Index with the effective dates of state APL laws and apply the index to check the robustness of the results. Regarding the issue of the laws' applicability to home purchases loans, I presume that anti-predatory lending laws were applied only to mortgage refinancing and not to home purchases. However, even if APL laws applied to home purchases in some states, the difference between the two markets will show the lower bound of laws' effect. That is, ideally, the home purchases market would not be covered by APL laws and would provide a hypothetical control group. However, the control group is contaminated and the laws may affect some part of the home purchase market. Still the difference between the two markets will provide the lower bound of the laws' effect, in a worst case scenario.

The metropolitan statistical area (MSA) as of Dec 2009[23] is used as a main regional unit of interest. Considering the local characteristics of the housing market, MSA-level analysis is more appropriate than state-level analysis. For applying state-level law indices to MSA-level analysis, state-level law indices are mapped into a MSA-level variable. For those MSAs within a state, the state law index has been assigned. For those MSAs across several different states, a population-weighted state index has been assigned. There are 44 MSAs across multiple states.[24] For example, in the Chicago-Naperville-Joliet, IL-IN-WI MSA for the years 1998-2007, on average, 91% of the population lived in Illinois, 7% lived in Indiana,

[23]See http://www.whitehouse.gov/sites/default/files/omb/assets/bulletins/b10-02.pdf.

[24]44 MSAs include the Boston-Cambridge-Quincy, MA-NH MSA, the Charlotte-Gastonia-Concord, NC-SC MSA, the Chicago-Naperville-Joliet, IL-IN-WI MSA, the Minneapolis-St. Paul-Bloomington, MN-WI MSA, the New York Northern New Jersey-Long Island, NY-NJ-PA MSA, the Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA, and the Washington-Arlington-Alexandria, DC-VA-MD-WV MSA.

and 2% lived in Wisconsin. As a result, the law index assigned to Chicago-Naperville-Joliet, IL-IN-WI MSA is closest to the law index of Illinois. Figure 1 reports the MSA-level CFED Index on the map of the United States.

3. Data

I have collected data from several sources for the analysis including: 1) loan-level residential mortgage origination data from the Home Mortgage Disclosure Act (HMDA); 2) MSA-level consumer expenditure data from the Consumer Expenditure Survey (CES) prepared by the Bureau of Labor Statistics (BLS); 3) MSA-level house price index (HPI) from the Federal Housing Finance Agency (FHFA); 4) MSA-level mortgage rates from the Monthly Interest Rate Survey (MIRS) by the FHFA; 5) MSA-level elasticity of housing supply data from Saiz (2010); 6) MSA-level unemployment rates from the BLS and; 7) MSA-level income and population data from the Bureau of Economic Analysis (BEA).

Loan Origination: The Home Mortgage Disclosure Act (HMDA)

Enacted by Congress in 1975, the Home Mortgage Disclosure Act, or HMDA, requires most mortgage originators located in metropolitan areas to report basic attributes of mortgage applications. HMDA covers a broad set of financial institutions, both depository and non-depository. Inclusion of an institution depends on the size of its origination and the weight of residential mortgage lending in its portfolio.[25]

Because HMDA covers a wide number of loans across the country, using HMDA offers great advantage in analyzing loan origination process. HMDA is known as the most comprehensive source of mortgage origination data, and covers almost 80% of all home loans nationwide (Avery, Brevoort, and Canner (2007b)). Table 2 reports the scope of the HMDA

[25]Any depository institution with an office in an MSA must report to HMDA if it has originated any home purchase loans or has refinanced any home purchase loans and if it has assets above an annually adjusted threshold ($39 million for 2010). Any non-depository institution with at least 10% of its portfolio in home purchase loans must report to HMDA if its assets exceed $ 10 million. As a result, small lenders and lenders without any office in a MSA are not reported in the HMDA data (Dell'Ariccia, Igan, and Laevan (2009)).

data by comparing it with the mortgage origination estimate from the Mortgage Bankers Association (MBA).[26] From 1998 to 2007, on average, the HMDA data covers 84% of total originations, 94% of total originations in the refinance market, and 76% of total originations in the home purchase market.

HMDA data includes loan characteristics such as loan type (conventional or government-backed), loan purpose (home purchase, home improvement, and refinancing), types of property (single-family and multifamily), loan amounts, and location (state, county, and Census tract). HMDA data also includes borrower characteristics such as income, race, and gender. In addition, HMDA data provides the status of applications, that is, whether a loan was originated or denied.

I use HMDA data from 1998 to 2007. This includes the period of the recent housing market boom, which is the year of interest for this study. To analyze the impact of state APL laws on mortgage loan origination, I focus on conventional single-family loans.[27] Following the suggestion by Avery, Brevoort, and Canner (2007a), I categorize home improvement loans as refinancing. Using the five-digit Federal Information Processing Standard (FIPS) code, I aggregate loan-level data into MSA-level data using the MSA definition as of December 2009. In total, 363 MSAs are defined.

In Table 3, I present the summary statistics of variables. Panel A in Table 3 summarizes the variables from HMDA data. The number of applications (APPL), the amount of origination (AMTO), and denial rates (DR) are reported by loan purpose: home purchase or refinance. First, refinance loans show a greater average number of applications and a greater average amount of originations than applications and originations for home purchase loans. The average AMTO is $2.93 billion for refinance loans but $2 billion for home purchase loans. The average APPL in refinance loans is twice as large as in home purchase loans. Second, the standard deviations of APPL and AMTO are also larger in refinance loans than

[26] See http://www.mbaa.org/ResearchandForecasts/ForecastsandCommentary.

[27] Government-backed loans are regarded as safer mortgages and less likely to be affected by abusive mortgage practice. Normally, multi-family loans are not covered under the APL laws.

in home purchase loans, implying larger variations of APPL and AMTO across MSAs in mortgage refinancing. Last, refinance loans show a higher average denial rate (42.74%) than home purchase loans (28.84%).

Expenditure: The Consumer Expenditure Survey (CES)

To measure household economic activity, the expenditure data from the Consumer Expenditure Survey (CES) is used. The survey data is collected for the Bureau of Labor Statistics by the U.S. Census Bureau to provide information on the buying habits of American consumers, including data on their expenditures, income, and consumer unit (families and single consumers) characteristics. The data provides households' expenditures in detailed categories: food, housing, transportation and alcoholic beverages.

Due to confidentiality issues, specific geographic information of sample households is missing in public microdata. However, BLS additionally reports MSA-level expenditures for some major MSAs.[28] The number of available MSAs changes from period to period: 28 MSAs from 1998 to 2004, 24 MSAs in 2005, and 18 MSAs from 2006 onward. In spite of the small number of samples, those MSAs encompass wide coverage and include most of the representative MSAs in the country: Atlanta , Baltimore, Boston, Chicago, Cleveland, Dallas-Fort Worth, Detroit, Houston, Los Angeles, Miami, Minneapolis-St.Paul, New York, Philadelphia, Phoenix, San Diego , San Francisco, Seattle, and Washington, D.C.

Panel C in Table 3 summarizes average consumer expenditures for 1998 to 2007. Total annual expenditures are on the first row and detailed breakdowns by expenditure purpose follows. The mean of annual consumer expenditures was $47,176. Among MSAs with a full sample, the highest average expenditure during the sample period ($59,267) was reported in San Francisco, CA, and the lowest average expenditure ($40,727) was in Cleveland, OH. On average, expenditures for housing (35%), transportation (18%), and food (13%) add up to two-thirds of total expenditures.

[28] See http://www.bls.gov/cex/csxmsa.htm

Local Housing Market and Demographics

To control for the condition of local housing markets, three variables are considered. First is the house price index (HPI) from the Federal Housing Finance Agency (FHFA).[29] The HPI Index is available for all 363 MSAs. Second, the regional mortgage rates are from the Monthly Interest Rate Survey (MIRS) by the FHFA.[30] The survey provides annual information on interest rates, loan terms, and house prices by state. Data for all of 51 states is available.

Lastly, the elasticities of housing supply are from Saiz (2010). Using satellite-generated geographic data, he measured the supply elasticity of housing as a function of both the amount of developable land and the regulatory constraints.[31] However, the supply elasticities are defined by the MSA definition as of 1999 and a significant change in the MSA definition occurred in 2000. I link up 1999 MSAs with current MSAs by hand-matching counties in MSAs. In total, I find 280 MSAs according to the current definition where the housing supply elasticity is applicable.

In addition to the controls for the regional housing market, local demographics are considered. MSA-level unemployment rates are taken from the BLS data. Average personal income and population of MSAs are taken from the Bureau of Economic Analysis (BEA). Demographic variables are available for all 363 MSAs.

Panel B in Table 3 summarizes the variables of local housing market conditions and local demographics, from 1998 to 2007. The effective interest rates on mortgage (EFFINT) are

[29]In 1975, the HPI was developed by the Office of Federal Housing Enterprise Oversight, or OHFEO as a regulator of Fannie Mae and Freddie Mac. In 2008, OHFEO became a part of FHFA. The HPI was called the OHFEO HPI, but now is called as the FHFA HPI. The FHFA HPI is a weighted, repeat-sales index of single-family house price. It means that the HPI measures average price changes in repeat sales or refinancings on the same properties in 363 MSAs. Information is obtained by the mortgage transactions that have been purchased or securitized by Fannie Mae or Freddie Mac. Since the HPI Index only includes houses with mortgages within the conforming amount limits, the index has a natural cap and does not account for jumbo mortgages.

[30]The survey was conducted by asking a sample of mortgage lenders to report the terms and conditions on all single-family, purchase-money, non-farm loans. The survey excludes FHA-insured and VA-guaranteed loans, multifamily loans, mobile home loans, and loans created by refinancing another mortgage. Although the data only incorporates home purchase loans, it is still useful to control for the level differences between the regional mortgage rates.

[31]Data is available from Saiz's website. http://real.wharton.upenn.edu/∼saiz/.

a variable by state. Annual home price appreciation (HPIAPP), housing supply elasticity (Elasticity), unemployment rates (UNEMP), per capita income (INC), and the log number of populations (logPOP) are the variables by MSA. For the housing supply elasticity, the Los Angeles-Long Beach-Santa Ana, CA MSA shows the lowest elasticity with 0.63 and the Pine Bluff, AR MSA shows the highest elasticity with 12.15.

4. The Effect on Home Mortgage Origination

Home mortgage origination has been largely affected by housing prices, mortgage interest rates, and housing supply elasticity. Here, the effects of these variables on home mortgage origination have been examined by loan purpose, using the U.S. aggregate data.

First is the effect of mortgage interest rates on the amount of origination (AMTO) and on the denial rate (DR). When mortgage rates are low, households can refinance existing mortgages with either lower periodic payments, or larger cash-out amounts, or both. And households can borrow with lower interest cost when they purchase a home. Considering that mortgage originators have supported increased demand during the recent housing boom period (Dell'Ariccia, Igan, and Laevan (2009)), the decline in mortgage rates will increase the AMTO and decrease the DR, in both refinance loans and home purchase loans. Figure 2 reports the AMTO and the DR with the 30-year mortgage rate.[32] The HMDA data is used to report the U.S. aggregate AMTO and the U.S. average DR, by loan purpose. In panel A of figure 2, the AMTOs in mortgage refinancing and in home purchases are compared with the 30-year mortgage rate. AMTOs are negatively related to the mortgage rate, both in mortgage refinancing and in home purchases, but the negative correlation is more evident in refinancing loans. The AMTO in mortgage refinancing rapidly increases from 2000 to 2003 and this period coincides with the large decline of mortgage rates. After 2004, mortgage rates stopped declining and the AMTO in mortgage refinancing dropped considerably. In

[32]The conventional, conforming 30-year fixed-rate from Primary Mortgage Market Survey by Freddie Mac is used (http://www.freddiemac.com/pmms/pmms_archives.html).

panel B, the DR in mortgage refinancing and in home purchases are compared with the 30-year mortgage rate. DRs are positively correlated with the mortgage rate. In both markets, a large drop in the DR appeared with the large decline of mortgage rates from 2000 to 2003.

Second is the effect of housing price on the AMTO and on the DR. When home prices increase, households can refinance their home loans to cash-out the increased home equity. Although the role of home price appreciation on the demand for home purchase loans is not obvious, the demand will increase if households expect a momentum in home prices. Mortgage originators are more willing to originate home mortgage when the collateral value rises. Figure 3 reports the AMTO and the DR with the U.S. national Home Price Index (HPI) from FHFA. As before, the HMDA data is used for the U.S. aggregate AMTO and the U.S. average DR, by loan purpose. The HPI is compared with AMTOs in panel A and with DRs in panel B, by loan purpose. While AMTOs show positive correlation with the HPI, DR is negatively related to the HPI.

Third is the role of elasticity of housing supply. Historically, inelastic MSAs have experienced precipitous increases of HPI. Given the supply constraint, when there is a demand shock, price has reacted more sensitively in inelastic MSAs. Glaeser, Gyourko, and Saiz (2008) show that the price run-ups of the 1980s were almost exclusively experienced in cities where the housing supply is more inelastic. Figure 4 reports the time-series of the HPI by housing supply elasticity. MSAs are divided into two groups: elastic MSAs and inelastic MSAs. Average HPIs of the groups are plotted. The plot shows that HPI appreciation has been isolated to inelastic MSAs during the recent housing boom. Larger mortgage demands in inelastic MSAs are expected since the expected benefit from home price appreciation is high. Figure 5 reports the time series of the AMTO and the DR, by elasticity. The time-series of the AMTO and the DR are reported, in panel A and panel B respectively, by loan purpose and by supply elasticity. Panel A shows that the growth in the AMTO has been concentrated in inelastic MSAs, both in the refinance market and in the home purchase market. Panel B shows that the DR in refinancing tends to be low in inelastic MSAs.

In summary, home price appreciation and the decline of mortgage rates tends to promote home-based borrowing, by increasing the amount of originations and by decreasing the denial rate. Growth in the amount of origination has been concentrated in inelastic areas.

The Impact of Anti-Predatory Lending Laws on Mortgage Refinancing

I test the hypothesis that anti-predatory lending laws inhibited the volume of refinancing mortgage during the housing-bubble period. I use cross-state variation in the strictness of state anti-predatory lending laws and their application to only mortgage refinancing as opposed to home purchases to develop a difference-in-difference estimate of the impact of these laws on mortgage volume. Since the laws applied only to mortgage refinancing and not to home purchases, but the predatory lending occurred in both markets, the comparison between the two markets will identify the laws' effect by using the home purchase market as a control group. Following regression is applied to refinance loans and home purchase loans separately.

$$Y_{it} = \alpha + \alpha_t + \beta \cdot APL_i + \gamma_0 \cdot HPIAPP_{it} + \gamma_1 \cdot EFFINT_{it} + \gamma_2 \cdot Elasticity_i + \theta \cdot X_{it} + \epsilon_{it}$$

where, the i and t index, respectively, represent MSA and year. The years covered by the regression are from 1998 to 2007. The denial rate (DR), the log amount of origination (logAMTO), and the log number of applications (logAPPL), are left-hand side variables. The CFED Index is used for the APL law variations. Control variables include annual home price appreciation (HPIAPP), state-level mortgage rate (EFFINT), supply elasticity (Elasticity), income per capita (INC), unemployment rate (UNEMP), and the log numbers of population (logPOP). Year dummy variables are included. For the robust level of significance, all

standard errors are clustered by state. Testing hypothesis is as follows:

$$\beta_{DR} > 0, \beta_{AMTO} < 0, \text{ and } \beta_{APPL} < 0 \text{ in refinance loans}$$

$$\beta_{DR} = 0, \beta_{AMTO} = 0, \text{ and } \beta_{APPL} = 0 \text{ in home purchase loans.}$$

Table 4 reports the regression results. Columns (1)-(3) report the results on refinance loans and columns (4)-(6) report the results on home purchase loans. Strict APL law is associated with a significant increase in the DR, a significant decrease in the logAMTO, and a significant decrease in the logAPPL, only in refinance loans. A stark contrast between mortgage refinancing market and home purchases market controls any endogenous factor that might simultaneously affect the cross-state variation of the APL law and predatory mortgage lending. If the predatory mortgage volumes are correlated with any state-specific variable, then the law effect should appear in home purchase market. For example, both the cross-state law variation and predatory mortgage volume could be affected by liberal versus conservative sentiments in the states, but the difference between refinancing and home purchases rejects that argument.

On average, a unit increase in the APL law Index raises the denial rate by 0.43%, decreases the amount of origination by 2.85%, and decreases the number of applications by 1.69% while all other variables are held constant. Considering that the APL law index ranges from 0 to 12, the results show significant reduction in refinancing volume in states with the strictest laws. The economic significance of the APL variable is also large. The economic significance is calculated and reported under the APL variable in Table 4. For example, a one-standard deviation increase in the APL law index is associated with a 0.15-standard deviation increase in the DR. (A one-standard deviation increase in APL is associated with a 3.52 [1 SD] x 0.00428 [slope] = 0.015 increase in DR, which is 0.015 / 0.1 = 0.15-standard deviation of DR.)

Among control variables, HPIAPP, EFFINT, and Elasticity show similar results both in

refinance loans and in home purchase loans. Note that the variables reflect local housing market conditions. With favorable market signals, the DR declines, the logAMTO increases, and the logAPPL increases. Favorable market signals include high HPIAPP, low EFFINT, and low Elasticity. For other control variables, higher INC is associated with a decline in the DR, an increase in the logAMTO, and an increase in the logAPPL. High UNEMP does the opposite. logPOP is positively associated with the logAMTO and the logAPPL.

Whether the reduction in mortgage volume comes solely from inhibited predatory loans remains as an empirical question. In principle, the anti-predatory lending laws can also inhibit legitimate high-cost loans. Previous studies on the law effect showed that the reduction in subprime mortgage volume mostly came from high-cost loans with predatory terms (Elliehausen, Staten, and Steinbuks (2006); Li and Ernst (2007)).

I find that the reduction in mortgage refinancing volume becomes larger as the Loan-to-Income ratio (LTI) increases. Table 5 reports the regression results by LTI. Regressions are same as in Table 4 except that a dependent variable, logAMTO, is disaggregated by LTI. Columns (1)-(4) report the results on mortgage refinancing and columns (5)-(8) report the results on home purchases. As in Table 4, strict APL laws are associated with a significant decrease in the logAMTO only in refinance loans. The magnitude of reduction is larger in high LTI groups. On average, a unit increase in the APL law index decreases the amount of originations by 4.51% in the highest LTI group but by 1.79% in the lowest LTI group. Similar results appear in DR (not reported). The denial rate in mortgage refinancing volume also increases with larger LTI. A unit increase in the APL law index raises the denial rate by 0.58% in the highest LTI group but by 0.34% in the lowest LTI group. Considering that LTI is one of the frequently used proxy measures for the riskiness of loans, this result shows that the laws have been more influential on the loans with higher risk characteristics.

Robustness

To avoid the issue of law persistence, which encompasses anticipatory compliance with forth-

coming laws and lagtime in compliance after enactment, and the issue of pre-existing non-HOEPA law, a static cross-section of the CFED Index has been applied in the analysis. For the robustness of the results regarding the time-varying law index, I develop a time-varying CFED Index by interacting the CFED Index with the effective dates of state APL laws. Table 6 reports the regression results. The main results in Table 4 are unchanged.

For the robustness of the results regarding the choice of sample period, I run the same regressions with different sample periods. Regression results are robust by any choice of sample year. For brevity, the regression results with different sample years are not reported.

5. The Effect on Household Expenditure

During the recent housing boom period, favorable market conditions for household credit coexisted in the home mortgage market: low mortgage rates, high home price appreciation, and evolutions in the mortgage market such as securitization. U.S. household leverage increased sharply during the period and a significant share of the rise came from the borrowings against increased home equity by existing homeowners. (Greenspan and Kennedy (2007); Khandani, Lo, and Merton (2010)). However, Mian and Sufi (2011) found that money extracted through refinancing was not used for other investments or the repayment of existing debts, postulating that the money must have been used for "real outlays" such as consumption or home improvements.

Using the finding that anti-predatory lending laws inhibited the volume of mortgage lending only in refinancing, I test whether household expenditures have been affected by mortgage refinancing availability in the recent housing boom. Starting with a reduced form model for the APL laws' effect on household expenditures, I instrument the amount of origination in refinancing by the APL law to conduct IV analysis, for testing the effect of the APL laws on household expenditures through volume of mortgage refinancing. Considering the pivotal role of refinancing to the housing wealth effect on household consumption (Muell-

bauer (2008); Cooper (2009); Peek (2010)), significant reductions in household expenditures is expected in states with strict APL laws.

Following regression is applied to the household expenditures by purpose.

$$Y_{it} = \alpha + \alpha_t + \beta \cdot APL_i + \gamma_0 \cdot HPIAPP_{it} + \gamma_1 \cdot EFFINT_{it} + \gamma_2 \cdot Elasticity_i + \theta \cdot X_{it} + \epsilon_{it}$$

where the i and t index, respectively, represent MSA and year. The years covered by the regression are 1998 to 2007. Left-hand side variables are the annual average expenditures of the consumer unit. MSA-level household expenditure data is from the Consumer Expenditure Survey (CES). The CFED index is used for the APL law variation. Control variables include annual home price appreciation (HPIAPP), state-level mortgage rate (EFFINT), supply elasticity (Elasticity), income per capita (INC), unemployment rate (UNEMP), and the log numbers of population (logPOP). Year dummy variables are included. All standard errors are clustered by state.

Table 7 reports the regression results. Panel A reports the regression results on total expenditures and panel B reports the results on the expenditures by purpose. Panel C reports the results by subdividing the expenditure purposes in panel B. For brevity, demographic control variables are not reported. Panel A shows that strict APL law is significantly related to the reduction in total expenditures. On average, a unit increase in the APL law index reduces the total expenditure by \$754 while all other variables are held constant. The economic significance is also large. A one-standard deviation increase in the APL law index is associated with a 0.28-standard deviation decline in total expenditures. (A one-standard deviation increase in the APL law index is associated with a 2.73 [1 SD] x 754 [slope x -1] = 2058.42 decrease in total expenditures, which is 2058.42 / 7475.56 = 0.28-standard deviation of DR.) Among control variables, EFFINT is negatively associated with household expenditures. Elasticity, INC, and logPOP are positively associated with expenditures. Annual home price appreciation does not show any significance.

Panel B reports the significant reduction in various expenditure purposes. Statistical significance appears for the expenditure purposes, including Food, Housing, Apparel and Services, Transportation, Personal Care Products and Services, and Personal Insurance and Pensions. On average, a unit increase in the APL law Index reduces the expenditure on Housing by $273.1, Transportation by $173, Personal Insurance and Pensions by $92.75, and Food by $64.08, while all other variables are held constant. Considering that the expenditures for Food accounts for the third largest portion of total expenditures, reduction in the Food expenditure is relatively small compared to the other expenditure purposes. Economic significances are also large in most of the expenditure purposes.

Panel C reports the regression results by subdividing the expenditure purposes in panel B. In the Food category, a significant reduction appears in the expenditures for Food Away From Home but not for Food At Home. Households cut expenses for eating out without cutting the expenditure for home cooking. Note that the expenditures for Fruits and Vegetables show significant reduction among the subcategories of Food At Home. In the category of Housing, significant reductions are found in most of the expenditure purposes. The largest expenditure reduction comes from Shelter, which includes Owned Dwellings and Rented Dwellings.[33] In the Transportation category, the expenditures on Gasoline and Motor Oil and Other Vehicle Expenses show significant decline. Among the control variables, EFFINT is negatively related to various expenditure purposes, including Owned Dwellings. Since the definition of Owned Dwellings includes not only the costs of interest payments but also the other expenses for owned dwellings, the EFFINT is negatively associated with the expenditure on it.

Instead of the reduced form model in Table 7, I instrument the amount of origination (AMTO) in refinancing with the APL law index to test whether household expenditures increase with refinancing funding availability. The CFED index is used for the APL law

[33]The definition of Owned Dwellings includes expenses for repairs and maintenance (including DIY), interest on mortgages, refinancing/payment charges, and property insurance. The definition of Rented Dwellings includes rent paid for dwellings, parking fees, maintenance, and other expenses.

variation. Details of regression specification are same as in Table 7.

$$Y_{it} = \alpha + \alpha_t + \beta \cdot AMTO_{it}^{IV} + \gamma_0 \cdot HPIAPP_{it} + \gamma_1 \cdot EFFINT_{it} + \gamma_2 \cdot Elasticity_i + \theta \cdot X_{it} + \epsilon_{it}$$

where the i and t index, respectively, represent MSA and year.

Table 8 reports results. Panel A reports the regression results on total expenditures and panel B reports the results on the expenditures by purpose. F-statistics in the first stage regression are significant with any level of significance (p-value=0.0000). In panel A, the instrumented AMTO increases total expenditure. In panel B, the increase in household expenditures remains for various purposes. The results indicate that a significant portion of household expenditures have been increased by extended mortgage refinancing availability in states with weak APL laws. By controlling the amount of origination in refinance through the APL law variation, I find that household expenditures increase with a larger amount of origination in refinancing in the states with weak APL laws. Since the APL laws discipline the mortgage refinancing market by restricting excessive lending, the extra expenditures must have been unsustainable without the influx of home equity dollars.

6. Discussion

Considering that most of the predatory loans occurred in the subprime market, analyzing the subprime market alone would show stronger results. However, an effective distinction between subprime loans and prime loans is unattainable in the analysis due to data issues. First, HMDA does not identify whether a loan application is for subprime or prime. Second, common methods for identifying subprime loans in HMDA are not suitable for this study.

To separate subprime loans from prime loans, two different methods have been commonly used by researchers: 1) the rate spread data in HMDA, or 2) the Subprime and Manufactured Home Lenders list by the Department of Housing and Urban Development (HUD).[34] Since

[34]http://www.huduser.org/portal/datasets/manu.html.

the HUD list is only available up to 2005 and the rate spread in HMDA is available from 2004, inconsistency in defining subprime lending is inevitable. Considering that the two methods have own inherent biases[35] in measuring subprime volumes and that 2004-2005 were the years of extra importance, the change of definition in 2004-2005 makes it hard to separate the subprime market results. When using the HUD list for identifying subprime loans in HMDA, Gerardi, Shapiro, and Willen (2007) estimate that 26% of loans by prime lenders were in the category of subprime loans.

7. Conclusion

In this paper, I test the impact of anti-predatory lending laws, examining 1) whether the laws inhibited mortgage volume, especially in mortgage refinancing, during the housing-bubble period and 2) whether restricted mortgage refinancing as a result of these laws reduced household consumption. The impact of anti-predatory lending laws is a little-studied but important question, since the laws are closely connected to the main characteristic features of the recent housing crisis.

Predatory lending practices in the home mortgage market have grown with mortgage

[35]In 2004, HMDA started to report the rate spread to the comparable-maturity Treasury for first-lien mortgages with an APR 3% points over the Treasury benchmark and for junior liens with an APR 5% percentage points over the benchmark. Researchers interpreted the loans with the rate spread information as a proxy for subprime loans. However, biases exist in this definition. Bias can be seen in the following: First, high interest rates do not occur solely in subprime loans. When the spread of mortgage rates increases relative to the Treasuries, 3% points over Treasury benchmark might classify some part of prime loans as subprime loans. Second, in cases of adjustable rate mortgage (ARM), subprime loans might be under-represented. Using comparable-maturity Treasuries, an ARM with a contract maturity of 30 years will be compared with long-term Treasury security, which normally has higher than short-term interest rates. But ARMs' interest is based on short-term interest. So ARM loans are less likely to be identified as subprime loans than fixed rate mortgage (FRM) loans. Third, there is no consideration for regional differences in the interest rate for classifying subprime loans. As a result, a loan originated in the region with a high average interest rate is more likely defined as a subprime loan than the same loan originated in a region with low interest rates. Finally, the rate spread is reported only if a loan is originated, so we cannot compute a denial rate for subprime loans.

In the HMDA data before 2004, researchers defined subprime loans using the HUD list of subprime lenders. HUD made a list of subprime lenders by identifying lenders that specialize in subprime lending (See Mayer and Pence (2008) for more detailed explanation). But defining subprime loans by the HUD list also generates bias. Subprime lenders may also originate prime loans, and non-subprime lenders can originate subprime loans. Gerardi, Shapiro, and Willen (2007) suggested that the latter case is a larger source of bias and subprime loans would be understated by this method.

credit expansion. To cope with increasing evidence of predatory lending practices, Congress enacted the Home Ownership and Equity Protection Act (HOEPA) in 1994. Since HOEPA was deemed insufficient to curb abusive practices, many states enacted laws limiting predatory mortgage lending to fill HOEPA's gaps. State anti-predatory lending laws followed HOEPA's structure but employed varying levels of strictness based on their own interests. As a result, state laws varied in the strictness of their provisions.

I use cross-state variation in the strictness of anti-predatory lending (APL) laws and their application only to mortgage refinancing as opposed to home purchases to develop a difference-in-difference estimate of the impact of these laws on mortgage volume. Consistent with my hypothesis, I find that states with stricter laws had lower mortgage refinancing volume but exhibited no difference in home purchase mortgage volume. I find that the reduction in mortgage refinancing volume becomes larger as the Loan-to-Income ratio increases.

I also test whether by restricting mortgage refinancing, these laws impacted household expenditures. I use the result that the laws inhibited the mortgage refinancing volume to estimate a reduced form model for the APL laws' effect on household expenditures. I find that strict APL laws are significantly associated with the reduction in total expenditures. Next, I instrument the amount of origination (AMTO) in mortgage refinancing with the APL law index to conduct IV analysis. I find that the instrumented AMTO increases total household expenditures. This indicates that a significant portion of household expenditures have been increased by extended mortgage refinancing availability in states with weak APL laws.

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Table 1: Indices for the State Anti-Predatory Lending Laws

Table 1 reports the indices on the state anti-predatory lending laws. Panel A reports the indices by state. Column (1) shows the index from the Corporation for Enterprise Development (2007). Columns (2)-(4) show the index from Ho and Pennington-Cross (2006). The HP Index measures the law by two separate dimensions: Coverage and Restriction. Full Index is the sum of the Coverage Index and the Restriction Index. Columns (5)-(8) show the index from Bostic et al. (2008). The BEA Index extends the HP Index by introducing the Enforcement Index in addition to the Coverage Index and the Restriction Index. Full Index is the sum of the three indices. In column (9), effective dates of the state anti-predatory lending laws are reported. Effective dates exist only for states with comprehensive anti-predatory lending laws. Panel B reports summary statistics of the law indices. Panel C reports the correlation matrix between the indices.

Panel A : Indices by State

	CFED	**HP**			**BEA**				**Effective**
		Full	Coverage	Restriction	Full	Coverage	Restriction	Enforcement	**Date**
State	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
New Mexico	12	12.91	6.28	6.63	9.9	4.17	3.27	2.46	1/1/04
North Carolina	12	5.07	1.11	3.96	6.4	1.72	3.27	1.41	7/1/00
Massachusetts	10	9.68	4.13	5.55	8.43	2.15	3.82	2.46	11/7/04
Rhode Island	10				0	0	0	0	12/31/06
West Virginia	10				9	5.6	1.64	1.76	6/5/02
New Jersey	9	6.27	3.13	3.14	7.34	2.15	2.73	2.46	11/27/03
South Carolina	9	8.83	2.36	6.47	4.8	0.86	2.18	1.76	1/1/04
New York	8	6.82	4.13	2.69	5.82	2.15	1.91	1.76	4/1/03
Georgia	7	14.89	4.13	10.76	6.83	1.72	3	2.11	3/7/03
Illinois	6	17.16	8.73	8.43	8.11	3.74	1.91	2.46	1/1/04
Arkansas	5	10.06	2.73	7.33	6.56	1.72	2.73	2.11	7/16/03
DC	5	14.89	10.5	4.39	7.76	3.74	1.91	2.11	5/7/02
Indiana	5	7.55	2.36	5.19	6.75	1.29	3	2.46	1/1/05
Minnesota	4				7.01	6.46	0.55	0	1/1/03
Tennessee	4				0	0	0	0	1/1/07
Texas	4	3.8	0.74	3.06	4.33	0.86	1.36	2.11	9/1/01
Vermont	3				0	0	0	0	
Alaska	2				0	0	0	0	
Connecticut	2	6.93	2.73	4.2	4.88	0.86	1.91	2.11	10/1/01
Florida	2	1.98	0	1.98	3.75	0	1.64	2.11	10/2/02
Iowa	2				0	0	0	0	
Maine	2	1.47	1.47	0	3.01	0	0.55	2.46	
Maryland	2	10.51	5.84	4.67	3.4	1.44	0.55	1.41	10/1/02
Michigan	2				5.99	5.17	0.82	0	12/23/02
Idaho	1				0	0	0	0	
Kansas	1				0	0	0	0	
Kentucky	1	4.96	0.74	4.22	5.85	0.86	2.18	2.81	6/24/03
Missouri	1				0	0	0	0	
Virginia	1				0	0	0	0	6/26/03
Wisconsin	1	2.63	1.55	1.08	0	0	0	0	2/1/05
Alabama	0				0	0	0	0	
Arizona	0				0	0	0	0	
California	0	7.07	5.09	1.98	4.92	2.15	1.36	1.41	7/1/02
Colorado	0	16.18	12.87	3.31	4.18	0.43	1.64	2.11	6/7/03
Delaware	0				0	0	0	0	
Hawaii	0				0	0	0	0	
Louisiana	0				0	0	0	0	
Mississippi	0				0	0	0	0	
Montana	0				0	0	0	0	
Nebraska	0				0	0	0	0	3/20/03
Nevada	0	1.47	1.47	0	2.81	0	0	2.81	10/1/03
New Hampshire	0				0	0	0	0	1/1/04
North Dakota	0				0	0	0	0	
Ohio	0	2.37	1.47	0.9	3.47	0	1.36	2.11	5/24/02
Oklahoma	0	4.59	0.74	3.85	4.29	0	2.18	2.11	1/1/04
Oregon	0				0	0	0	0	
Pennsylvania	0	2.91	1.47	1.44	3.47	0	1.36	2.11	6/25/02
South Dakota	0				0	0	0	0	
Utah	0	2.55	1.47	1.08	3.9	1.72	2.18	0	5/3/04
Washington	0				0	0	0	0	
Wyoming	0				0	0	0	0	

Table 1 (continued)

Panel B : Summary Statistics

	CFED	**HP**			**BEA**			
		Full	Coverage	Restriction	Full	Coverage	Restriction	Enforcement
State	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mean	2.80	7.34	3.49	3.85	3.00	1.00	1.00	1.00
S.D.	3.64	4.85	3.23	2.67	3.19	1.62	1.17	1.10
Max	12	17.16	12.87	10.76	9.9	6.46	3.82	2.81
Min	0	1.47	0	0	0	0	0	0

Panel C : Correlation Matrix

	CFED	**HP**			**BEA**			
		Full	Coverage	Restriction	Full	Coverage	Restriction	Enforcement
State	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CFED	1.00	0.40	0.13	0.57	0.67	0.55	0.66	0.44
HP								
Full		1.00	0.86	0.78	0.64	0.69	0.40	0.21
Coverage			1.00	0.35	0.40	0.57	0.08	0.11
Restriction				1.00	0.69	0.56	0.63	0.25
BEA								
Full					1.00	0.79	0.88	0.79
Coverage						1.00	0.49	0.30
Restriction							1.00	0.78
Enforcement								1.00

Table 2: The Coverage of the HMDA Data

Table 2 compares the HMDA data with the mortgage origination estimate from the Mortgage Bankers Association (MBA) as a benchmark. The HMDA data includes conventional single-family loans. Benchmark estimates also cover all home mortgages for single-family loans. Panel A reports the total originations. Panel B reports the amount of originations for home purchase loans. Panel C reports the amount of originations for refinance purpose loans. In each panel, the HMDA data is compared with the mortgage origination estimate from the MBA.

Panel A: Total Originations

Year	HMDA	Market (Estimate)	Coverage
	(millions of dollars)		*(percent)*
1998	1,292	1,656	78.00
1999	1,078	1,379	78.15
2000	882	1,139	77.40
2001	1,798	2,243	80.17
2002	2,495	2,854	87.43
2003	3,327	3,812	87.28
2004	2,470	2,773	89.08
2005	2,774	3,027	91.64
2006	2,505	2,726	91.90
2007	1,965	2,306	85.23
Average	2,059	2,392	84.63

Panel B: Originations for Home Purchase

Year	HMDA	Market (Estimate)	Coverage
	(millions of dollars)		*(percent)*
1998	518	795	65.14
1999	589	878	67.11
2000	616	905	68.05
2001	671	960	69.94
2002	817	1,097	74.45
2003	903	1,280	70.55
2004	1,105	1,309	84.38
2005	1,325	1,512	87.62
2006	1,216	1,399	86.94
2007	922	1,140	80.84
Average	868	1,128	75.50

Panel C: Originations for Refinance

Year	HMDA	Market (Estimate)	Coverage
	(millions of dollars)		*(percent)*
1998	774	862	89.78
1999	488	500	97.69
2000	266	234	113.58
2001	1,127	1,283	87.82
2002	1,678	1,757	95.53
2003	2,424	2,532	95.74
2004	1,366	1,463	93.36
2005	1,449	1,514	95.71
2006	1,289	1,326	97.20
2007	1,044	1,166	89.51
Average	1,191	1,264	95.59

Table 3: Summary Statistics

Table 3 reports the summary statistics of the variables. The years covered are 1998 to 2007. Panel A summarizes the variables from the HMDA data. All variables are defined by the MSA. The number of applications (APPL), the amounts of originations (AMTO), and the denial rate (DR) are reported by loan purpose: home purchase and refinance. Panel B summarizes the variables on the local housing market conditions and local demographics. Effective interest rates on mortgages (EFFINT) is a variable by state. Annual home price appreciation (HPIAPP), housing supply elasticity (Elasticity), unemployment rates (UNEMP), per capita income (INC), and the log number of populations (logPOP) are the variables by MSA. Panel C summarizes consumer expenditures. Total annual expenditures are on the first row and detailed breakdowns by expenditure purposes follows.

Panel A: Mortgage Origination

		Obs	Mean	Std.Dev.	Min	Max	Source
Refinance Loans							
APPL		3630	30582	72748	596	1133482	HMDA
AMTO	($ bils)	3630	2.93	10.2	0.01	203.7	HMDA
DR	(%)	3630	41.74	10.01	12.51	71.15	HMDA
Home Purchase Loans							
APPL		3630	15830	35891	432	392243	HMDA
AMTO	($ bils)	3630	2.00	5.99	0.01	84.52	HMDA
DR	(%)	3630	28.84	11.31	9.65	77.09	HMDA

Panel B: Local Housing Market Conditions and Demographics

		Obs	Mean	Std.Dev.	Min	Max	Source
HPIAPP	(%)	3627	0.06	0.05	-0.13	0.34	FHFA
EFFINT	(%)	510	6.67	0.72	5.42	8.46	FHFA
Elasticity		280	2.52	1.42	0.63	12.15	Saiz (2010)
UNEMP	(%)	3630	0.05	0.02	0.01	0.3	BLS
INC	($)	3630	29502	6425	12723	79576	BEA
logPOP		3630	12.61	1.06	10.75	16.75	BEA

Table 3 (continued)

Panel C: Consumer Expenditure

	Obs	Mean	Std. Dev.	Min	Max	Source
Annual Expenditure	246	47,176	7,416	32,928	70,611	BLS
Food	246	5,970	843	3,888	8,393	BLS
Food at home	246	3,369	488	2,298	4,629	BLS
Cereals and bakery products	246	474	66	313	681	BLS
Meats, poultry, fish, and eggs	246	848	131	538	1,182	BLS
Dairy products	246	362	59	234	522	BLS
Fruits and vegetables	246	602	110	384	916	BLS
Other food at home	246	1,083	208	652	1,641	BLS
Food away from home	246	2,601	458	1,589	4,070	BLS
Housing	246	16,308	3,160	9,993	27,310	BLS
Shelter	246	10,058	2,511	4,946	19,519	BLS
Owned dwellings	246	6,637	1,647	3,080	12,526	BLS
Rented dwellings	246	2,812	1,004	1,412	6,432	BLS
Other lodging	246	609	221	222	1,454	BLS
Utilities, fuels, and public services	246	3,004	530	1,977	4,551	BLS
Household operations	246	910	315	383	2,871	BLS
Housekeeping supplies	246	566	101	328	853	BLS
Household furnishings and equipment	246	1,770	394	936	3,090	BLS
Transportation	246	8,326	1,366	5,108	12,596	BLS
Vehicle purchases (net outlay)	246	3,527	909	999	6,383	BLS
Gasoline and motor oil	246	1,574	524	862	3,274	BLS
Other vehicle expenses	246	2,654	400	1,748	3,759	BLS
Public transportation	246	572	237	196	1,479	BLS
Alcoholic beverages	246	479	139	222	928	BLS
Apparel and services	246	1,981	396	954	3,137	BLS
Healthcare	246	2,370	439	1,481	3,705	BLS
Entertainment	246	2,355	558	1,401	4,297	BLS
Personal care products and services	246	595	113	270	932	BLS
Reading	246	155	49	31	312	BLS
Education	246	887	342	285	1,895	BLS
Tobacco products and smoking supplies	246	291	83	95	538	BLS
Miscellaneous	246	885	244	240	2,090	BLS
Cash contributions	246	1,522	541	585	3,687	BLS
Personal insurance and pensions	246	5,053	1,260	3,026	9,408	BLS
Life and other personal insurance	246	413	118	130	1,078	BLS
Pensions and Social Security	246	4,640	1,260	2,632	8,905	BLS

Table 4: The Impact of the Anti-Predatory Lending Law on Home Mortgage Origination

Table 4 reports the regression results in refinance loans and in home purchase loans. I use cross-state variation in the strictness of state anti-predatory lending laws and their application to only mortgage refinancing as opposed to home purchases to develop a difference-in-difference estimate of the impact of these laws on mortgage volume. The years covered in the regression are 1998 to 2007.

$$Y_{it} = \alpha + \alpha_t + \beta \cdot APL_i + \gamma_0 \cdot HPIAPP_{it} + \gamma_1 \cdot EFFINT_{it} + \gamma_2 \cdot Elasticity_i + \theta \cdot X_{it} + \epsilon_{it}$$

where the i and t index, respectively, represent MSA and year. The log numbers of application (logAPPL), the denial rate (DR), and the log amounts of origination (logAMTO) are left-hand side variables. The CFED index is used for the APL law variations. Control variables include annual home price appreciation (HPIAPP), state-level mortgage rate (EFFINT), supply elasticity (Elasticity), income per capita (INC), unemployment rate (UNEMP), and the log numbers of population (logPOP). Year dummy variables are included (not reported). Columns (1)-(3) report the results on refinance loans and columns (4)-(6) report the results on home purchase loans. All standard errors are clustered by state. The table reports point estimates with robust t-statistics in parentheses. ***, **, * denotes 1%, 5%, and 10% statistical significance. Economic significance is also reported under the APL variable. For example, a one-standard deviation increase in the APL law index is associated with a 0.15-standard deviation increase in the DR. (A one-standard deviation increase in APL is associated with a 3.52 [1 SD] x 0.00428 [slope] = 0.015 increase in DR, which is 0.015 / 0.1 = 0.15-standard deviation of DR.)

	Refinance			**Home Purchase**		
	DR	logAMTO	logAPPL	DR	logAMTO	logAPPL
Variables	(1)	(2)	(3)	(4)	(5)	(6)
APL	0.00428***	-0.0285**	-0.0169***	0.00344	-0.00934	0.000335
	(2.915)	(-2.247)	(-2.752)	(1.620)	(-0.788)	(0.0296)
Economic Significance	*0.15*	*-0.07*	*-0.05*	*0.11*	*-0.02*	*0.00*
HPIAPP	-0.279***	2.849***	0.937***	-0.00501	4.034***	2.579***
	(-3.707)	(6.530)	(3.517)	(-0.0845)	(13.31)	(8.225)
EFFINT	0.0558*	-0.692***	-0.0510	0.0664*	-0.425***	0.0577
	(1.951)	(-2.728)	(-0.241)	(1.947)	(-2.865)	(0.368)
Elasticity	0.00300	-0.111***	-0.0556***	0.00423	-0.0952***	-0.0250
	(0.696)	(-3.573)	(-2.929)	(0.860)	(-3.725)	(-1.355)
INC	-5.50e-06***	5.53e-05***	1.42e-05**	-3.89e-06**	4.46e-05***	6.84e-06
	(-4.825)	(6.326)	(2.457)	(-2.589)	(6.619)	(1.541)
UNEMP	1.053***	-2.154	-1.083	0.843**	-3.624***	-3.206***
	(4.016)	(-1.331)	(-1.077)	(2.511)	(-2.902)	(-3.819)
logPOP	0.0237***	0.955***	0.983***	0.00636	1.007***	1.007***
	(5.296)	(32.14)	(42.31)	(1.386)	(39.72)	(52.08)
Constant	-0.268	5.106**	-2.836*	-0.151	2.250**	-4.457***
	(-1.337)	(2.600)	(-1.734)	(-0.575)	(2.367)	(-4.204)
Observations	2,800	2,800	2,800	2,800	2,800	2,800
R-squared	0.631	0.917	0.946	0.371	0.937	0.936
S.E. Clustered by	State	State	State	State	State	State
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: By Loan-to-Income ratio

Table 5 reports the regression results by the Loan-to-Income ratio. Dependent variable is the log amounts of origination (logAMTO) by LTI. The CFED index is used for the APL law variations. Control variables include annual home price appreciation (HPIAPP), state-level mortgage rate (EFFINT), supply elasticity (Elasticity), income per capita (INC), unemployment rate (UNEMP), and the log numbers of population (logPOP). Year dummy variables are included (not reported). Columns (1)-(4) report the results on mortgage refinancing and columns (4)-(6) report the results on home purchases. The years covered in the regression are 1998 to 2007. All standard errors are clustered by state. The table reports point estimates with robust t-statistics in parentheses. ***, **, * denotes 1%, 5%, and 10% statistical significance.

	Refinance				**Home Purchase**			
	Highest LTI			Lowest LTI	Highest LTI			Lowest LTI
	4th Quarter	3rd Quarter	2nd Quarter	1st Quarter	4th Quarter	3rd Quarter	2nd Quarter	1st Quarter
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
APL	-0.0451*	-0.0308*	-0.0153*	-0.0179***	-0.0239	-0.0101	0.00320	-0.00407
	(-1.760)	(-1.996)	(-1.945)	(-2.786)	(-0.987)	(-0.849)	(0.448)	(-0.393)
HPIAPP	4.812***	2.909***	1.349***	0.818**	5.555***	3.326***	2.731***	4.375***
	(6.837)	(5.953)	(3.970)	(2.665)	(11.20)	(10.62)	(5.788)	(9.977)
EFFINT	-0.209***	-0.124***	-0.0571**	-0.0463***	-0.179***	-0.0906***	-0.0408	-0.0533
	(-3.691)	(-3.499)	(-2.506)	(-3.005)	(-4.570)	(-3.721)	(-1.513)	(-1.596)
Elasticity	-1.407***	-0.647*	-0.0820	-0.0256	-1.126***	-0.250	0.301*	0.0334
	(-3.010)	(-1.877)	(-0.385)	(-0.185)	(-3.605)	(-1.176)	(1.766)	(0.174)
UNEMP	-1.793	-2.944	-3.131**	-2.609**	-3.548	-4.677***	-3.834***	-2.531**
	(-0.601)	(-1.549)	(-2.619)	(-2.196)	(-1.380)	(-3.185)	(-3.027)	(-2.151)
logPOP	0.949***	0.979***	0.953***	0.935***	1.016***	1.028***	0.964***	0.985***
	(20.36)	(29.22)	(36.73)	(36.19)	(31.32)	(44.41)	(31.03)	(25.98)
INC	7.64e-05***	5.45e-05***	3.80e-05***	3.24e-05***	6.66e-05***	4.16e-05***	2.59e-05***	2.40e-05***
	(5.572)	(5.659)	(5.353)	(4.673)	(6.264)	(5.244)	(3.730)	(3.440)
Constant	8.400**	3.303	-0.0769	-1.043	5.560**	-0.210	-3.522***	-3.023**
	(2.314)	(1.269)	(-0.0489)	(-1.026)	(2.389)	(-0.148)	(-3.429)	(-2.585)
Observations	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
R-squared	0.830	0.894	0.940	0.957	0.875	0.933	0.937	0.910
Observations	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
R-squared	0.830	0.894	0.940	0.957	0.619	0.679	0.663	0.401
S.E. Clustered	State	State	State	State	State	State	State	State
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Robustness Check for the Time-Varying Law Index

Table 6 reports the regression results in refinance loans and in home purchase loans. Instead of using the static law measure as in table 4, a time-varying law index is used by interacting the law index with the effective date of the state law ($APL_i \cdot I_{\{t>=ED\}}$). The effective date (ED) of the state law is reported in column (9) of Table 1. The years covered in the regression are 1998 to 2007.

$$Y_{it} = \alpha + \alpha_t + \beta \cdot APL_i \cdot I_{\{t>=ED\}} + \gamma_0 \cdot HPIAPP_{it} + \gamma_1 \cdot EFFINT_{it} + \gamma_2 \cdot Elasticity_i + \theta \cdot X_{it} + \epsilon_{it}$$

where the i and t index, respectively, represent MSA and year. The log numbers of application (logAPPL), the denial rate (DR), and the log amounts of origination (logAMTO) are left-hand side variables. The CFED index is used for the APL law variation. Control variables include annual home price appreciation (HPIAPP), state-level mortgage rate (EFFINT), supply elasticity (Elasticity), income per capita (INC), unemployment rate (UNEMP), and the log numbers of population (logPOP). Year dummy variables are included (not reported). Columns (1)-(3) report the results on refinance loans and columns (4)-(6) report the results on home purchase loans. All standard errors are clustered by state. The table reports point estimates with robust t-statistics in parentheses. ***, **, * denotes 1%, 5%, and 10% statistical significance. Economic significance is also reported under the APL variable. For example, a one-standard deviation increase in the APL law index is associated with a 0.11-standard deviation increase in the DR.

	Refinance			**Home Purchase**		
	DR	logAMTO	logAPPL	DR	logAMTO	logAPPL
Variables	(1)	(2)	(3)	(4)	(5)	(6)
APL	0.00364***	-0.0328**	-0.0218***	0.00195	-0.0108	-0.00317
	(3.249)	(-2.084)	(-3.344)	(1.033)	(-0.878)	(-0.322)
Economic Significance	0.11	-0.07	-0.06	0.05	-0.02	-0.01
HPIAPP	-0.283***	2.820***	0.902***	-0.0155	4.024***	2.555***
	(-3.733)	(6.555)	(3.461)	(-0.276)	(13.48)	(8.194)
EFFINT	0.0600**	-0.722***	-0.0694	0.0694*	-0.435***	0.0570
	(2.349)	(-3.011)	(-0.347)	(1.954)	(-3.076)	(0.369)
Elasticity	0.00329	-0.114***	-0.0569***	0.00445	-0.0959***	-0.0250
	(0.760)	(-3.639)	(-3.031)	(0.896)	(-3.726)	(-1.353)
INC	-5.48e-06***	5.50e-05***	1.39e-05**	-3.90e-06***	4.45e-05***	6.77e-06
	(-4.820)	(6.483)	(2.496)	(-2.688)	(6.721)	(1.514)
UNEMP	1.019***	-1.898	-0.924	0.818**	-3.540***	-3.198***
	(3.753)	(-1.145)	(-0.955)	(2.383)	(-2.807)	(-3.679)
logPOP	0.0237***	0.955***	0.984***	0.00645	1.007***	1.007***
	(5.128)	(32.60)	(42.84)	(1.438)	(40.10)	(51.87)
Constant	-0.285	5.233***	-2.756*	-0.162	2.292**	-4.451***
	(-1.547)	(2.790)	(-1.767)	(-0.578)	(2.504)	(-4.216)
Observations	2,800	2,800	2,800	2,800	2,800	2,800
R-squared	0.619	0.917	0.946	0.361	0.937	0.936
S.E. Clustered by	State	State	State	State	State	State
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: The Effect of the Anti-Predatory Lending Law on Household Expenditure

Table 7 reports the regression results on household expenditures.

$$Y_{it} = \alpha + \alpha_t + \beta \cdot APL_i + \gamma_0 \cdot HPIAPP_{it} + \gamma_1 \cdot EFFINT_{it} + \gamma_2 \cdot Elasticity_i + \theta \cdot X_{it} + \epsilon_{it}$$

where the i and t index, respectively, represent MSA and year. The years covered in the regression are 1998 to 2007. Household expenditures by purpose are left-hand side variables. Panel A reports the regression results on total expenditures and panel B reports the results on the expenditures by purpose. Panel C reports the results by subdividing the expenditure purposes in panel B. The household expenditure data is from the Consumer Expenditure Survey (CES). The CFED index is used for the APL law variation. Control variables include annual home price appreciation (HPIAPP), state-level mortgage rate (EFFINT), supply elasticity (Elasticity), income per capita (INC), the unemployment rate (UNEMP), and the log numbers of population (logPOP). Year dummy variables are included. For brevity, demographic control variables and year dummies are not reported. The number of observations is 232. All standard errors are clustered by state. The table reports point estimates with robust t-statistics in parentheses. ***, **, * denotes 1%, 5%, and 10% statistical significance. Economic significance is also reported. A one-standard deviation increase in the APL law index is associated with a 0.28-standard deviation decline in total expenditures. (A one-standard deviation increase in the APL law index is associated with a 2.73 [1 SD] x 754 [slope x -1] = 2058.42 decrease in total expenditures, which is 2058.42 / 7475.56 = 0.28-standard deviation of DR.)

	APL	*Econ Sig*	HPIAPP	EFFINT	Elasticity
Panel A : Total Expenditure					
Average annual expenditures	-754.0***	-0.28	-1,313	-7,029**	1,978*
	(-3.035)		(-0.109)	(-2.224)	(1.855)
Panel B : Expenditure by Purpose					
Food	-64.08**	-0.21	1,366	-464.6	333.9***
	(-2.272)		(0.965)	(-0.898)	(3.086)
Alcoholic beverages	-2.102	-0.04	-165.6	-87.05	-16.19
	(-0.422)		(-0.509)	(-0.928)	(-0.636)
Housing	-273.1***	-0.23	-176.7	-3,210***	42.24
	(-2.970)		(-0.0661)	(-3.915)	(0.169)
Apparel and services	-32.14*	-0.22	-307.6	32.11	140.6
	(-2.050)		(-0.349)	(0.134)	(1.526)
Transportation	-173.0**	-0.36	3,724	-1,811*	720.3*
	(-2.865)		(1.332)	(-1.881)	(2.047)
Healthcare	-8.774	-0.05	-528.2	-159.2	94.52
	(-0.468)		(-0.603)	(-0.547)	(1.289)
Entertainment	-35.96	-0.19	-1,410	-650.7	57.64
	(-1.398)		(-1.219)	(-1.716)	(0.486)
Personal care products and services	-17.04***	-0.41	191.3	42.21	31.35
	(-4.427)		(1.060)	(0.724)	(1.202)
Reading	-1.976	-0.12	-73.82	-45.35	-0.146
	(-1.103)		(-0.639)	(-1.273)	(-0.0126)
Education	13.75	0.11	-484.9	76.91	-67.81
	(0.874)		(-0.755)	(0.492)	(-1.032)
Tobacco products and smoking supplies	5.824	0.20	-145.6	117.3*	-15.67
	(1.224)		(-0.691)	(1.838)	(-0.879)
Miscellaneous	-25.38*	-0.29	-340.4	-7.853	-28.53
	(-1.980)		(-0.788)	(-0.0784)	(-0.985)
Cash contributions	-47.31*	-0.23	-1,309	-87.80	169.6
	(-2.007)		(-0.835)	(-0.254)	(1.451)
Personal insurance and pensions	-92.75*	-0.20	-1,651	-775.3*	516.0**
	(-1.886)		(-0.880)	(-1.961)	(2.385)

Table 7 (continued)

Panel C : Expenditure by Detailed Purpose

	APL	*Econ Sig*	HPIAPP	EFFINT	Elasticity
Food					
Food at home	-28.88	-0.17	1,447*	-129.5	97.03
	(-1.364)		(1.777)	(-0.337)	(1.207)
Cereals and bakery products	-1.122	-0.05	176.3	-1.432	11.94
	(-0.329)		(1.299)	(-0.0258)	(0.887)
Meats, poultry, fish, and eggs	-0.998	-0.02	545.4**	76.77	17.34
	(-0.214)		(2.248)	(0.923)	(0.561)
Dairy products	-3.077	-0.15	197.6	-5.694	6.179
	(-0.953)		(1.507)	(-0.0992)	(0.529)
Fruits and vegetables	-10.69***	-0.27	281.4	-17.30	-2.364
	(-3.645)		(1.456)	(-0.224)	(-0.132)
Other food at home	-12.96	-0.17	246.6	-181.9	63.88*
	(-1.368)		(0.753)	(-1.192)	(1.913)
Food away from home	-35.19***	-0.21	-79.71	-334.7	236.9**
	(-3.284)		(-0.0803)	(-1.476)	(2.468)
Housing					
Shelter	-217.9***	-0.23	675.8	-2,641***	-335.6
	(-2.977)		(0.313)	(-3.759)	(-1.310)
Owned dwellings	-108.4*	-0.18	-1,140	-1,068**	-164.9
	(-1.773)		(-0.771)	(-2.120)	(-0.975)
Rented dwellings	-106.4**	-0.29	2,506	-1,485***	-136.8
	(-2.242)		(1.229)	(-3.331)	(-0.687)
Other lodging	-3.028	-0.04	-691.9	-87.43	-33.85
	(-0.519)		(-1.311)	(-0.623)	(-1.003)
Utilities, fuels, and public services	27.97*	0.14	-393.5	474.2***	230.0***
	(1.765)		(-0.561)	(3.005)	(2.899)
Household operations	-24.19*	-0.21	-490.5	-517.3**	44.02
	(-1.872)		(-0.625)	(-2.778)	(0.939)
Housekeeping supplies	-8.687	-0.24	58.60	70.63	13.22
	(-1.620)		(0.194)	(1.259)	(0.626)
Household furnishings and equipment	-50.30**	-0.36	-26.61	-595.8*	90.63
	(-2.273)		(-0.0259)	(-1.985)	(0.985)
Transportation					
Vehicle purchases (net outlay)	-55.10	-0.17	2,949	-1,384**	478.1*
	(-1.322)		(1.491)	(-2.124)	(1.914)
Gasoline and motor oil	-28.45**	-0.15	784.4**	-256.8**	136.0**
	(-2.606)		(2.663)	(-2.277)	(2.755)
Other vehicle expenses	-76.08***	-0.53	-68.31	-144.7	148.1*
	(-4.303)		(-0.0940)	(-0.487)	(1.753)
Public transportation	-13.39	-0.17	57.25	-25.45	-41.96
	(-1.094)		(0.172)	(-0.226)	(-1.704)
Personal insurance and pensions					
Life and other personal insurance	-2.523	-0.06	-109.9	72.24	37.98**
	(-0.401)		(-0.481)	(1.223)	(2.675)
Pensions and Social Security	-90.19*	-0.19	-1,540	-847.6**	478.0**
	(-2.022)		(-0.885)	(-2.374)	(2.277)

Table 8: The Effect of the Amounts of Origination in Mortgage Refinancing on Household Expenditure

Table 8 reports the regression results on household expenditures by purpose. The log amounts of origination (logAMTO) in mortgage refinancing is instrumented by the APL. The CFED index is used for the APL law variation. F-statistics in the first stage regression is significant with any level of significance (p-value=0.0000).

$$Y_{it} = \alpha + \alpha_t + \beta \cdot logAMTO_{it}^{IV} + \gamma_0 \cdot HPIAPP_{it} + \gamma_1 \cdot EFFINT_{it} + \gamma_2 \cdot Elasticity_i + \theta \cdot X_{it} + \epsilon_{it}$$

where the i and t index, respectively, represent MSA and year. The years covered in the regression are 1998 to 2007. Household expenditures by purpose are left-hand side variables. Panel A reports the regression results on the total expenditure and panel B reports the results on the expenditures by purpose. The household expenditure data is from the Consumer Expenditure Survey (CES). Control variables include annual home price appreciation (HPIAPP), state-level mortgage rates (EFFINT), supply elasticity (Elasticity), income per capita (INC), the unemployment rate (UNEMP), and the log numbers of population (logPOP). Year dummy variables are included. For brevity, demographic control variables and year dummies are not reported. The number of observations is 232. All standard errors are clustered by state. The table reports point estimates with robust t-statistics in parentheses. ***, **, * denotes 1%, 5%, and 10% statistical significance.

	$logAMTO^{IV}$	HPIAPP	EFFINT	Elasticity
Panel A : Total Expenditure				
Average annual expenditures	15,978*	-26,664	9,878	4,015
	(1.699)	(-0.996)	(0.724)	(1.279)
Panel B : Expenditure by the Purpose				
Food	1,358*	-788.5	972.3	507.0**
	(1.809)	(-0.358)	(0.852)	(2.043)
Alcoholic beverages	44.54	-236.2	-39.92	-10.51
	(0.427)	(-0.805)	(-0.248)	(-0.380)
Housing	5,788*	-9,359	2,915	780.1
	(1.820)	(-1.102)	(0.675)	(0.748)
Apparel and services	681.0	-1,388	752.7	227.4
	(1.344)	(-0.944)	(0.976)	(1.586)
Transportation	3,666*	-2,093	2,068	1,188
	(1.888)	(-0.320)	(0.670)	(1.410)
Healthcare	185.9	-823.2	37.55	118.2
	(0.448)	(-0.840)	(0.0607)	(1.247)
Entertainment	762.0	-2,619	155.6	154.8
	(1.088)	(-1.460)	(0.158)	(0.897)
Personal care products and services	361.2**	-381.7	424.4	77.40
	(1.980)	(-0.730)	(1.410)	(1.107)
Reading	41.88	-140.3	-1.028	5.193
	(1.057)	(-0.937)	(-0.0182)	(0.452)
Education	-291.4	-22.53	-231.4	-105.0
	(-1.046)	(-0.0264)	(-0.674)	(-0.946)
Tobacco products and smoking supplies	-123.4	50.18	-13.31	-31.41
	(-1.482)	(0.218)	(-0.112)	(-1.019)
Miscellaneous	537.9	-1,194	561.3	40.05
	(1.406)	(-1.199)	(1.165)	(0.407)
Cash contributions	1,003	-2,900	973.1	297.4
	(1.364)	(-1.405)	(0.895)	(1.361)
Personal insurance and pensions	1,965	-4,770	1,304	766.6
	(1.319)	(-1.308)	(0.635)	(1.498)

Figure 1: The MSA-level CFED index

Figure 1 reports the MSA-level CFED index on a map of the United States. For applying the state-level law indices to the MSA-level analysis, the state-level law indices are mapped into a MSA-level variable. First, for those MSAs within a state, the state law index has been assigned. Second, for those MSAs across several different states, a population-weighted state index has been assigned.

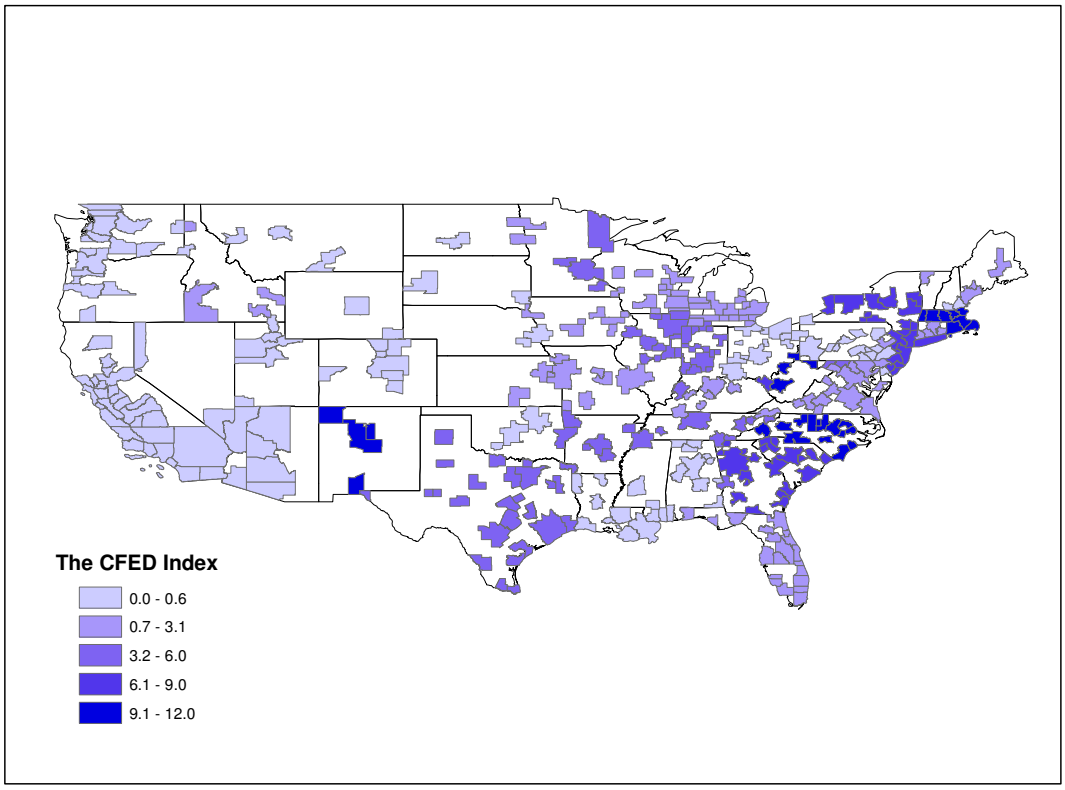

Figure 2: The Mortgage Rate and Home Mortgage Origination

Figure 2 reports the amounts of origination (AMTO) and the denial rate (DR) with the 30-year mortgage rate. Using the HMDA data, the U.S. aggregate AMTO and the U.S. average DR are reported by loan purpose. The conventional, conforming 30-year fixed-rate from the Primary Mortgage Market Survey by Freddie Mac is used. In panel A, the AMTO in mortgage refinancing and in home purchases are compared with the 30-year mortgage rate. In panel B, the DR in mortgage refinancing and in home purchases are compared with the 30-year mortgage rate.

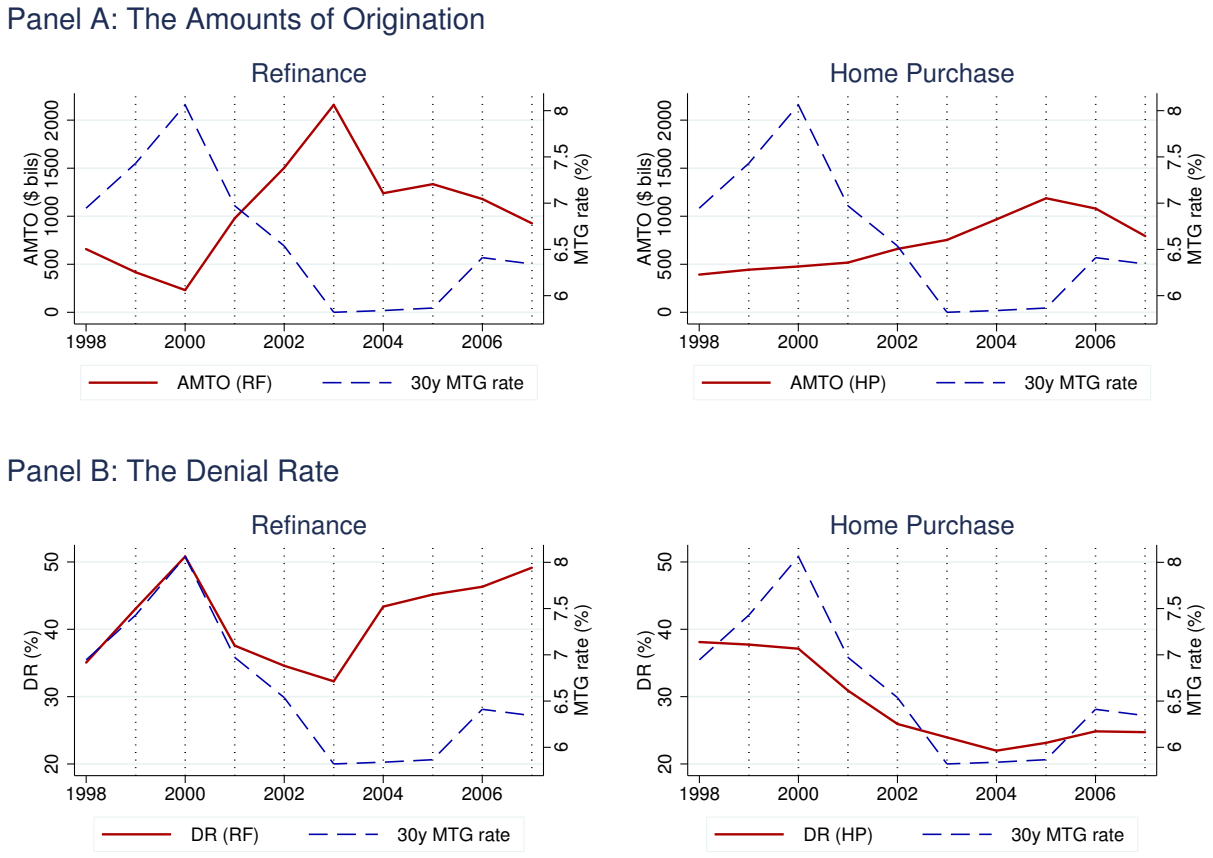

Figure 3: The Home Price Index and Home Mortgage Origination

Figure 3 reports the amounts of origination (AMTO) and the denial rate (DR) with the Home Price Index. Using the HMDA data, the U.S. aggregate AMTO and the U.S. average DR are reported by loan purpose. The U.S. national HPI from FHFA is used. In panel A, the AMTO in mortgage refinancing and in home purchases are compared with the HPI. In panel B, the DR in mortgage refinancing and in home purchases are compared with the HPI.

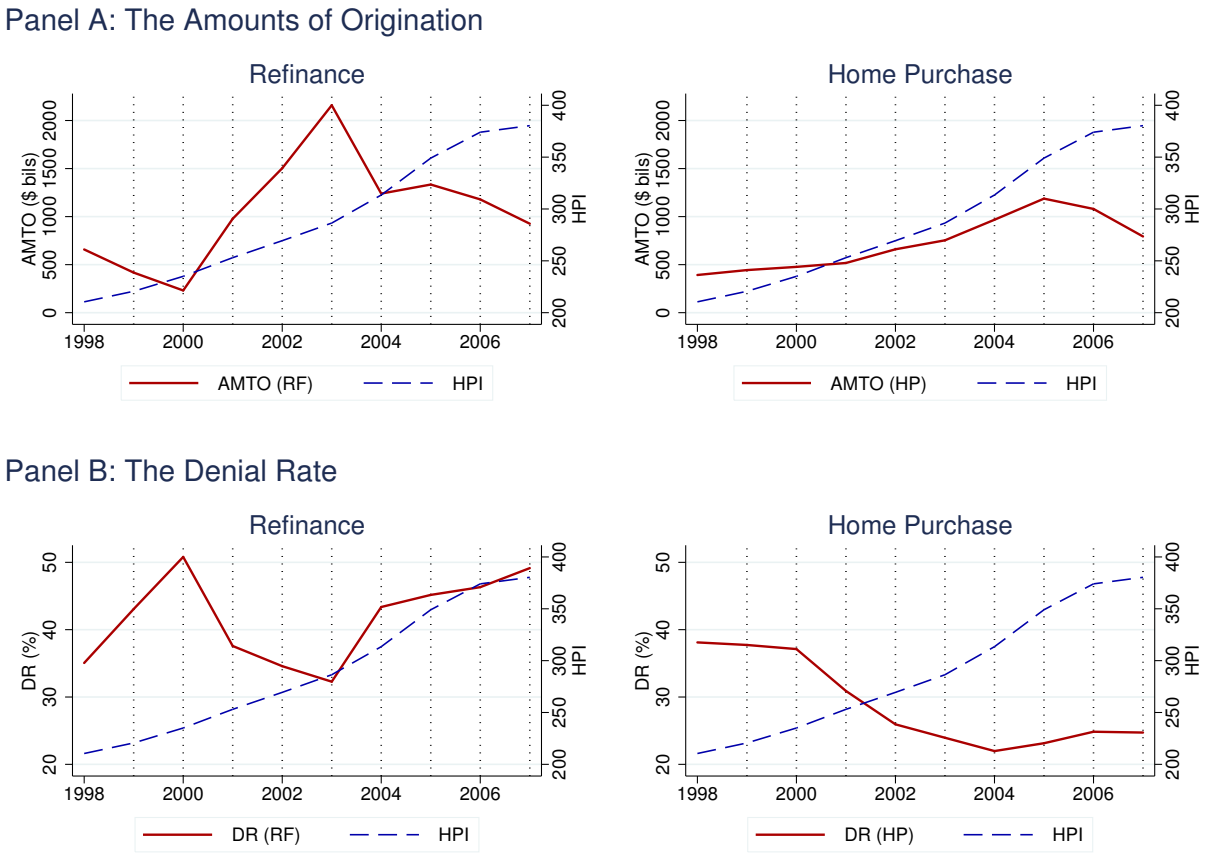

Figure 4: The Home Price Index by Elasticity of Housing Supply

Figure 4 reports time-series of the HPI by elasticity of the housing supply. By the elasticity of housing supply from Saiz (2010), MSAs are divided into the elastic MSAs and the inelastic MSAs. The average HPIs of the groups are plotted. The base year of the average HPI is 1980.

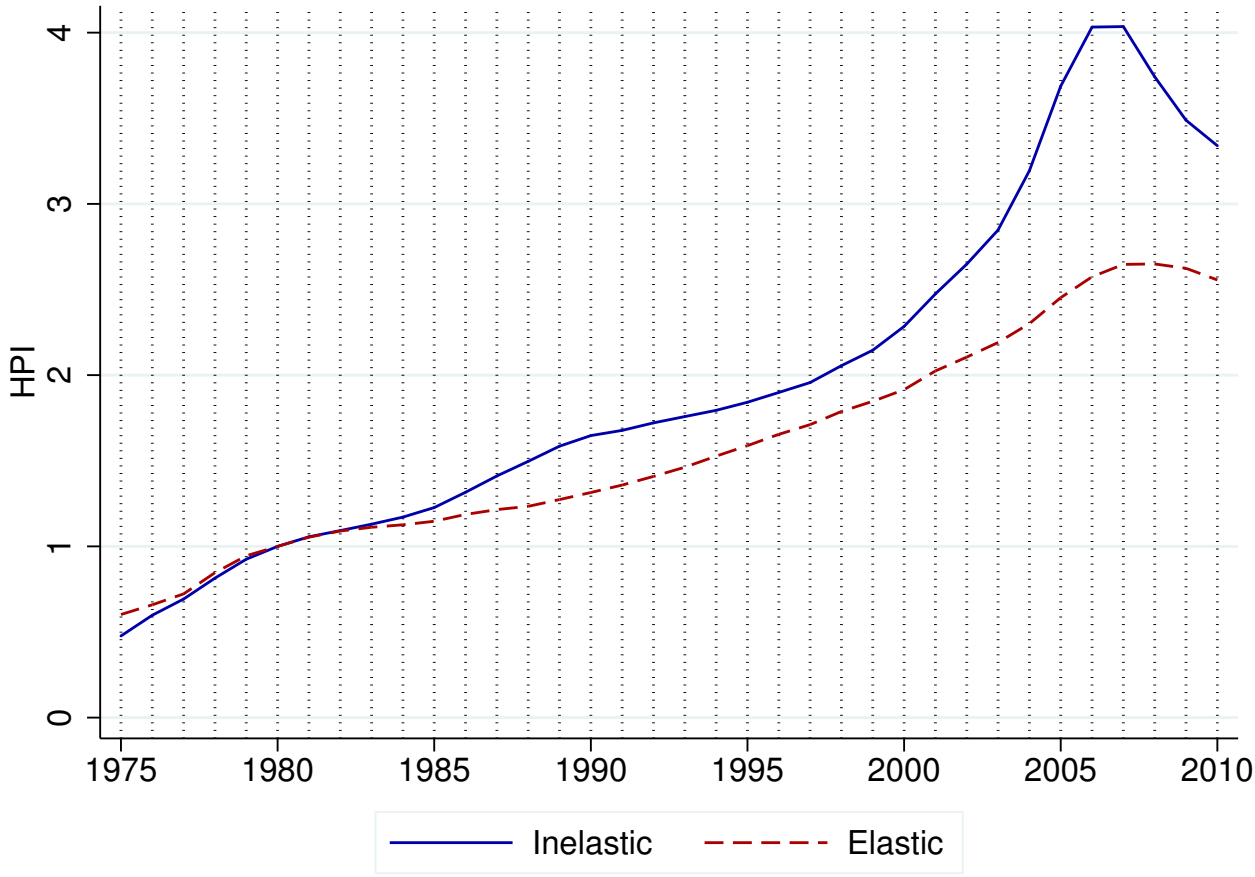

Figure 5: By Elasticity of Housing Supply

Figure 5 reports a time series of the amounts of origination (AMTO) and the denial rate (DR) by elasticity of the housing supply. By the elasticity of housing supply from Saiz (2010), MSAs are divided into the elastic MSAs and the inelastic MSAs. Panel A reports a time-series of the AMTO by the supply elasticity and the loan purpose. Panel B reports a time-series of the DR by the supply elasticity and the loan purpose.